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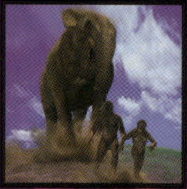

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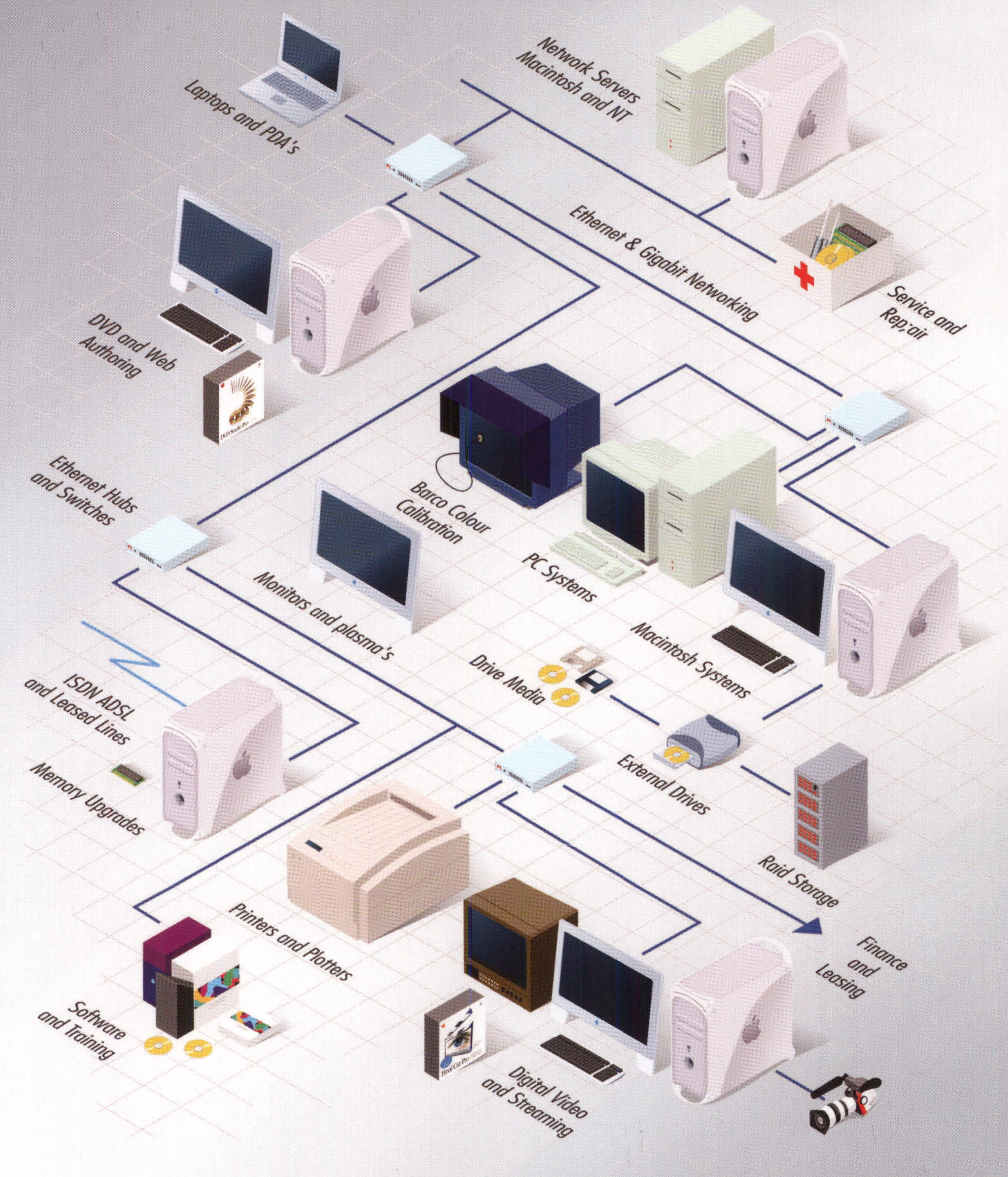

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It's been an incredibly exciting year for anyone interested in computer animation and CG effects. We've been treated to *Shrek*, *Harry Potter*, *Monsters Inc* and *The Lord of the Rings*, while the BBC has billed *Walking with Beasts* as the biggest thing on television this year. Now seems a great time to take an in-depth look at how convincing digital effects are created, and to talk to some leaders, as well as up and coming players, in the industry. In the past, we've tended to split video effects and 3D into two camps. Here, we've taken a more holistic view, combining 2D, 3D and compositing techniques to bring you what is hopefully the ultimate *Special Effects* issue. When deciding what should go in, we thought hard about some of the most memorable effects seen on film and TV and balanced those ideas with the practicalities of space in the magazine and the availability of software for the CD. So you can find out how to shrink people into Hobbits, design 3D dragon fire, create a calamitous Earth impact and make furry critters. If you'd like to see other techniques covered, or read about any particularly interesting people in the industry, drop us a line and let us know.

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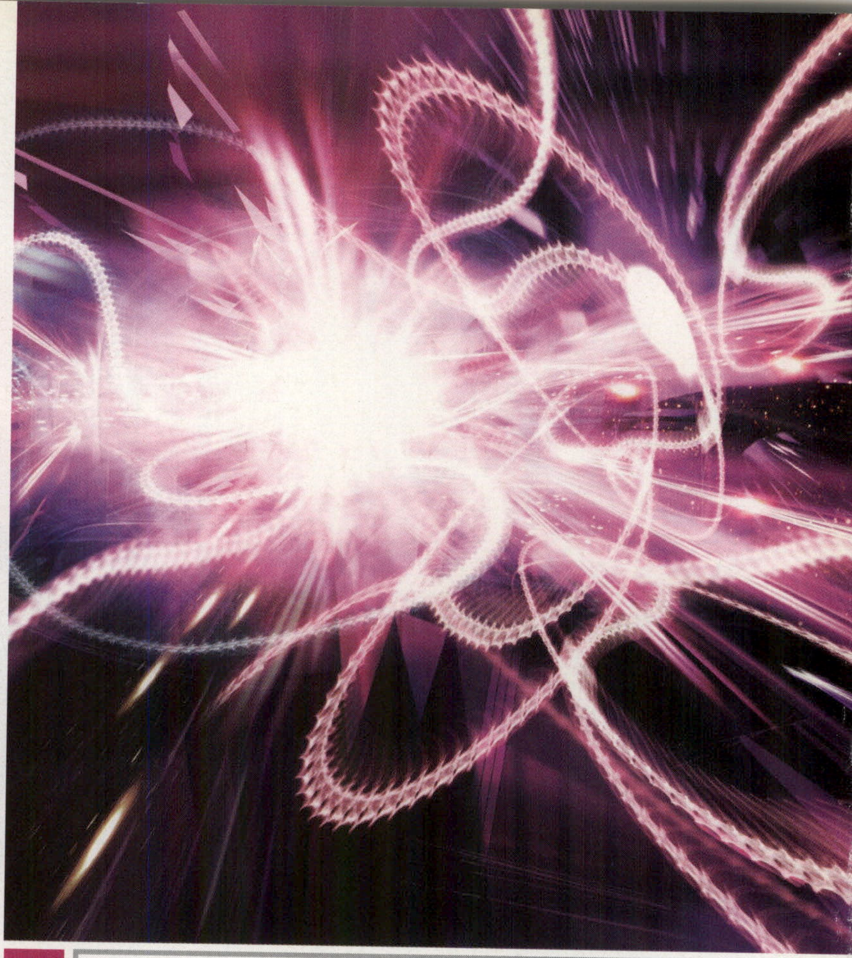

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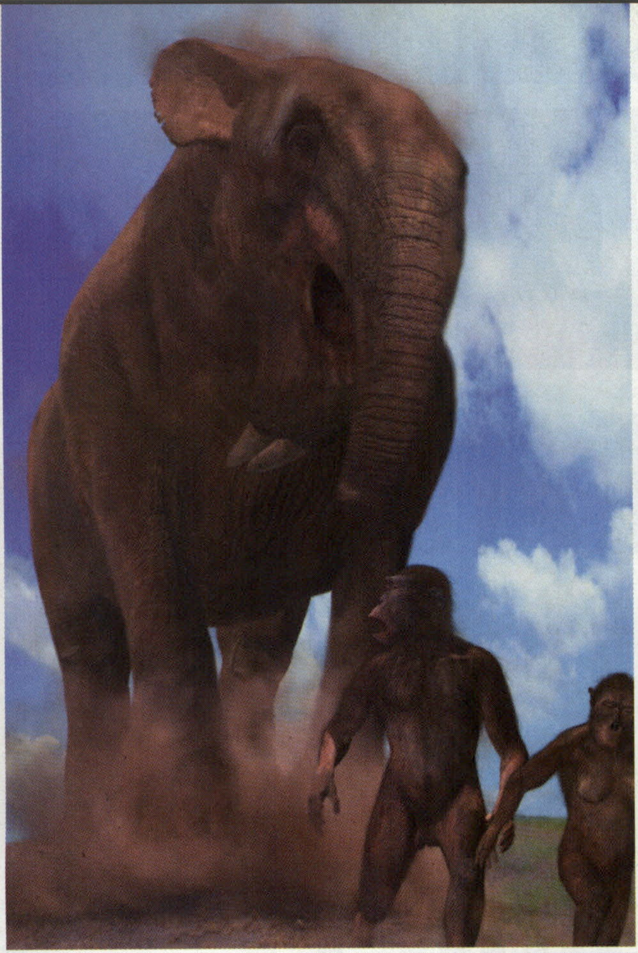

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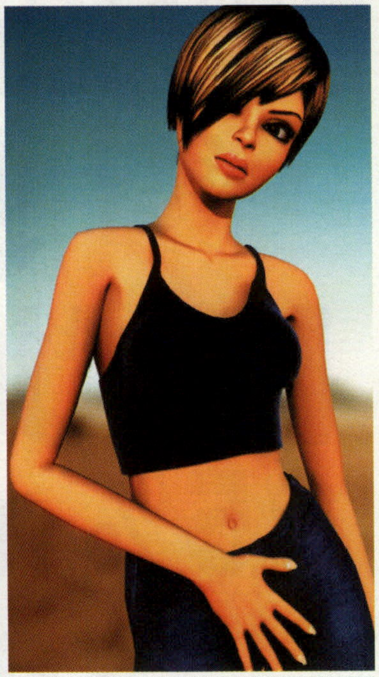

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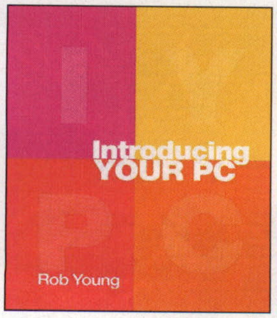

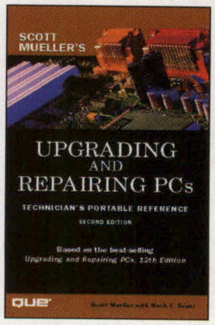

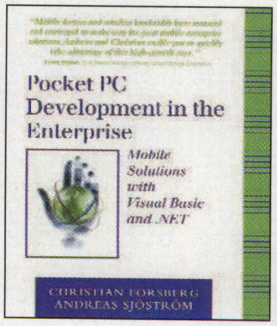
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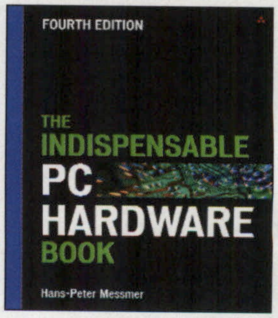

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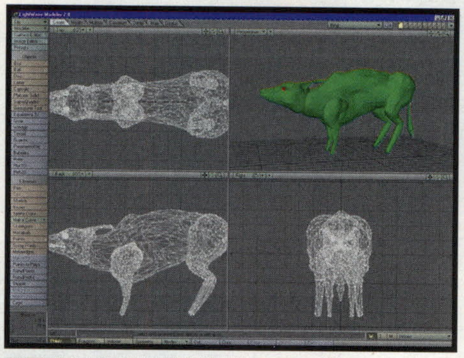

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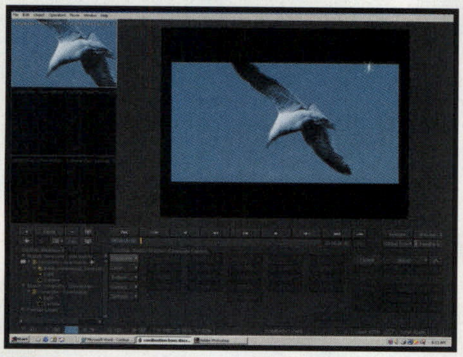

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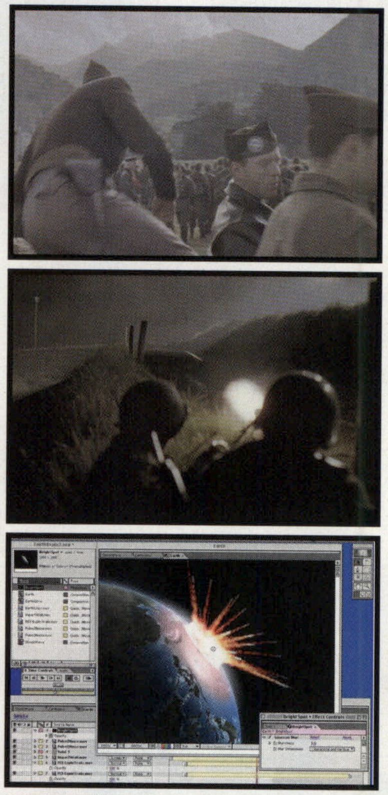

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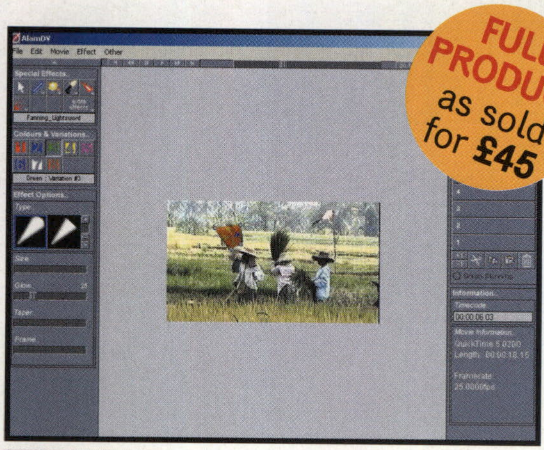

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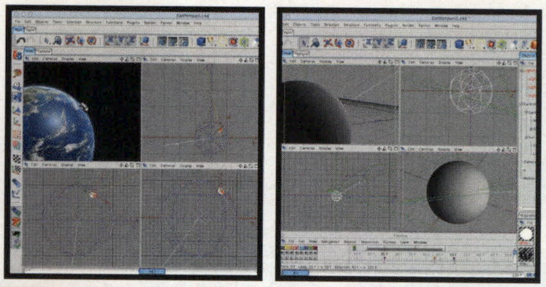

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LightWave 7

One of the best known 3D applications around, it's got a powerful and impressive renderer

Cinema 4D XL 7

We've included Maxon's 3D all-rounder so you can follow our Planet Explodes tutorial, page 68

After Effects 5

Our *Special Effects* issue wouldn't be complete without the chance to try out Adobe *After Effects*

combustion

Discreet's desktop compositing solution has many tools trickled down from the all powerful *flame*, *fire* and *inferno*. See page 76

Pinnacle plug-ins

Provided by Pinnacle Systems, *Primatte Keyer* and *Composite Wizard* are two *After Effects* plug-ins you could well find essential. They're employed in our tutorial on page 84

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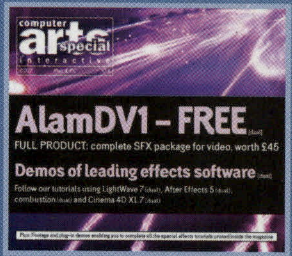

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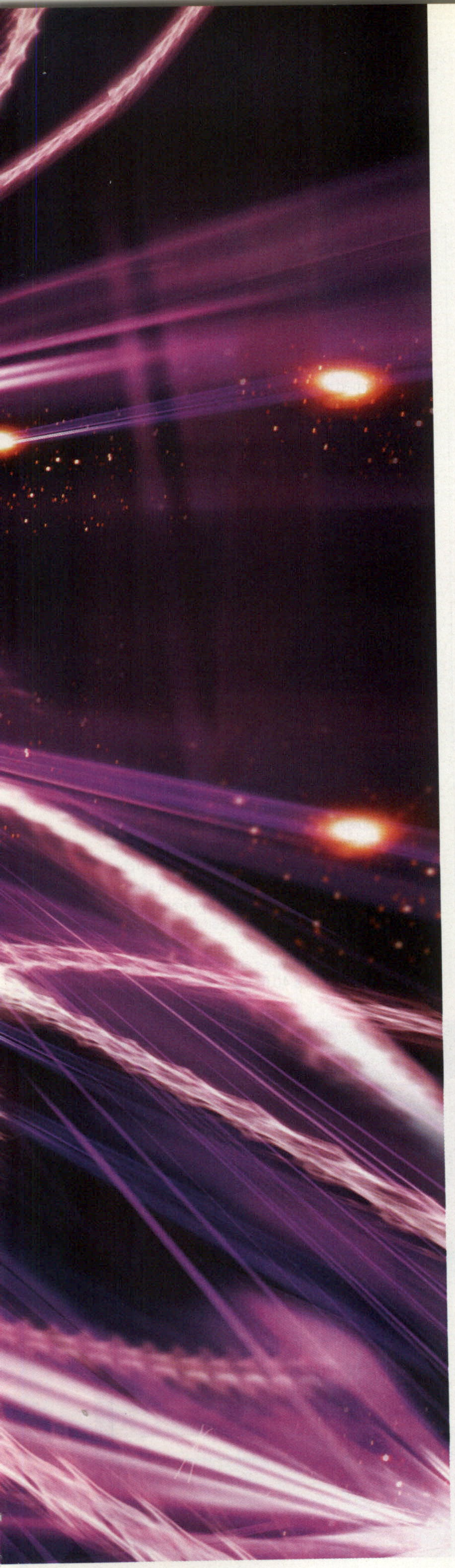


On the cutting edge

The visual effects industry is currently enjoying the dividend from many years of research into computer vision techniques. The result is desktop tools that take the donkey work out of vfx

Visual effects has a long history of borrowing technology from other disciplines and repurposing it to its own ends. Optical motion capture was lifted from the field of medical imaging, while much of the initial driving force behind the development of 3D and computers powerful enough to display its data in real-time came from the defence industry. Indeed, so adept have the Israelis proved at re-engineering their military technology for the broadcast industry, that their Ministry of Defence now actively invests in effects technology start-ups, and the two companies that lead the field in virtual set technology are both Israeli-originated.

The latest raft of software from the left-field to have a sizeable effect on the way visual artists work though, has come from the field of computer vision. Computer vision labs had worked for years on being able to make bombs 'see', the idea being that you can just show a bomb a picture of a particular building and off it will toddle at mach 4 and blow it to kingdom come.

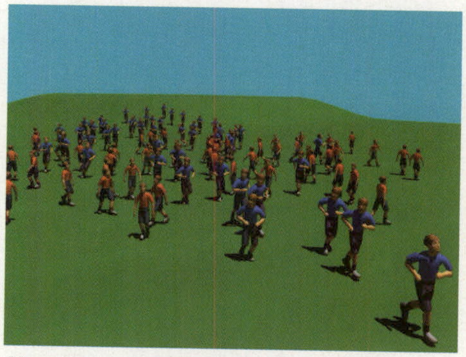
Success has so far been limited, and the widely-documented contraction in defence spending since the end of the Cold War has led researchers off into other areas.

One of the most fecund of these has been the quest for effective robot vision, enabling robots to interpret visual data and take independent action accordingly. And if NASA can get one of its Mars exploring robots to recognise a rock and drive round it – to extrapolate from a 2D image exactly where the camera is in relation to an object – the chances are that vfx software can detect the rock and remove it from the picture entirely.

"It's like artificial intelligence," comments Chris Steele, CEO of Oxford-based 2d3. "People started out with the idea that they would create a computer that could pass the Turing test, and while they haven't done that, along the way they produced many incredibly useful things which have been put to far more pragmatic use. That's the case with computer vision too. The goal was to equip a robot with autonomous vision, and these things that have been discovered along the way, such as figuring out where the robot is compared to where the robot was, have applications in our sphere, though the tools required a lot of further development to reach a level where they'd satisfy visual artists."

2d3's boujou

2d3's *boujou* matchmover has been one of the most impressive releases in the new wave of digital effects software. These are, for the main part, very much backroom tools. They save time, and expense and enable facilities to complete sequences that were previously thought impossible, such as tracking shots from helicopters. They free artists from the monotonous donkey work – tracking, wire removal and so on – that is still very much a part of special effects jobs and let them do something far more creative instead. Best of all, they tend to be cheap as well, ➤



Discreet's *character studio 3* Crowd module in operation. The jogging blue boy bipeds have been directed to run directly through a dense cluster of walking orange boy bipeds.

Realviz's *ImageModeler* and *Stitcher* were used here jointly to create a virtual tour of the *Will & Grace* sitcom set for nbc.com. Picture courtesy of NBC.

even the most high-end tools aimed at film production coming in at around the $10,000 mark.

boujou, which works fine on a P3 with 256MB RAM, is a case in point. Getting a reliable track out of a scene and being able to recreate the original camera movement is the key to being able to successfully composit in other data, particularly CG elements. Historically this has been done with locked off, static cameras, though software from Discreet, RealViz, Science.D.Visions and others has enabled an increasing amount of movement to be introduced over the past few years. *boujou* takes that development even further by making it automatic.

First unveiled in May 2000, the software uses core technology developed by robot vision researchers at Oxford University that enables it to automatically establish hundreds of tracking points in a frame (where, by way of comparison, a human operator will track about 10 points at the most).

Due to the sheer weight of numbers involved, running some fairly simple statistical analysis routines means the package is able to throw out any overtly aberrant marker data, leaving the operator with what the company claims is an extremely accurate 3D matchmove. This is then exported into the 3D software package of choice, though in practice the company has found a lot of facilities are using it to export 2D tracking information directly into a compositing package. It's fast, and reliable and, while this comes at the expense of some tweaking tools to deal with camera parameters, it is genuinely automatic.

At various trade shows since the software's launch, 2d3 has delighted in giving demonstrations where the software tracks unstabilised and extremely wobbly handheld camera shots, while the demo artists sit back, cross their arms and simply describe what's going on on screen.

Not only does this lead to a fatter pipeline for vfx companies to shovel their work through, but, as *boujou* has proved adept at tracking complex shots previously considered impossible, it also gives productions much greater flexibility, enabling them to really start swinging the viewpoint around.

And once you know exactly where that camera is, a whole load of other possibilities spring up too. Science.D.Visions' *3D-Equalizer*, for example, one of the most established matchmovers in the business, has developed the capability to link multiple simultaneously-shot sequences to each other, thus enabling it to process motion capture data.

Knowing the camera location also means that you can remove unwanted objects from a frame. Star turn at broadcast tradeshows in the latter part of the year has undoubtedly been Imagineer's new *Mokey* software, a package designed from the ground-up to ease the often Herculean task of rig removal, wire removal and generally getting rid of stuff that you don't want to appear in the final edit.

This comes out of computer vision research, a couple of researchers at Imperial College, London simply playing around with mosaicing algorithms. They started off with a sequence of Stefan Edberg playing tennis, put that through the mosaicing software and discovered that he slowly disappeared. They then thought 'What can that be used for?', set up a company and started work on developing a production-oriented package to achieve the same thing.

Again it's a process with a lot of in-built automation. First an operator selects an object using a spline interface, then the software tracks the object data before it removes all the elements of the foreground object and creates a moving matte. Next, it searches back and forth in the background plates of a sequence to fill in the missing pixels created by removing the foreground object, automatically colour correcting as it goes.

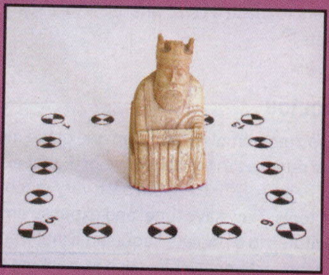
The potential time savings are impressive. At IBC, the company showed a 40 frame or so sequence of a

Low-cost photograms

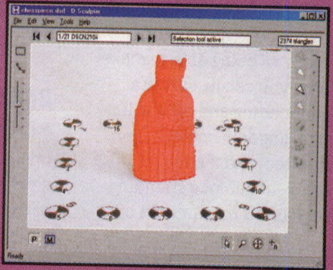
While a fairly low cost technology already, at a mere £500, *D Sculptor* from D Vision Works brings reliable photogrammetry very much down to affordable desktop levels.

"Other packages work by pointing out a number of reference points on an object and matching it up with different images," says MD, Ruggero Franich. "That's great for buildings and manufactured objects that have a limited number of vertices that you can easily point out, however people tend to want to model organically shaped things, which is very difficult. Ours works on different lines. It doesn't require you to do that, it requires you to sketch the outlines of an object."

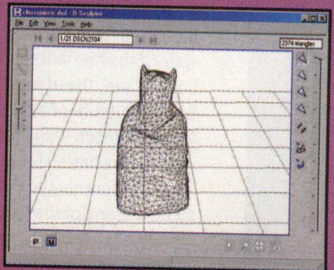
This technique, Franich says, lends itself easily to complex organic shapes. It's fast too. "At the moment, using *D-Sculptor* or similar, you can make a model in 20 or 30 minutes, say," he comments. "We've got a student coming in here who has knocked them off in under 15 minutes a few times now, and he's getting quicker and quicker."



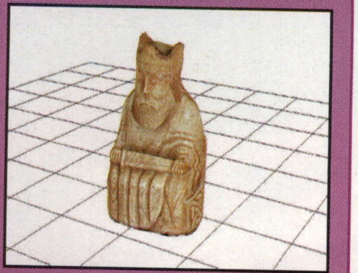
1 An object is first placed on the *D Sculptor* calibration pattern and photographed from a number of different viewpoints.



2 The photographs are imported into *D Sculptor* and the user indicates the positions of the markers and outline of the object.



3 The software extracts the 3D model and texture map. The poly count is user-definable.



4 The final, fully textured model. *D Sculptor* exports models to *3ds max, Maya, Bryce, VRML, DXF, Direct X* and *Shockwave 3D*.

Lola Post's vast CG crowd generated for the BT Stadium ad. 2D images are mapped onto cards in front of every seat.

skateboarder on an industrial estate in Guildford, removing him completely in around two minutes.

"In demo-ing that particular clip, I would ask before I started how long would it take people to take the skateboarder out and give me a clean background plate, and the responses ranged from an hour and a half, which I doubt, up to a couple of days," says Simon Davis, of *Mokey* distributor IS Distribution. "But then we can do that shot in two minutes, so even if you take the one and a half hours figure, the time-saving on that particular clip alone is immense."

Inevitably there are limitations to the technique at present. The whole of the required background needs to be visible at some point in the sequence for the foreground object to be replaced completely automatically for a start, while the company also points out that with this iteration, optimum results occur when the foreground object is fairly rigid and the background ones are on roughly the same plane. Still, the potential is huge, especially as the software's matte generation capabilities mean that productions won't have to be confined to shooting against blue to produce a key.

Satan's rotoscope

Photogrammetry, creating 3D geometry from a succession of 2D pictures, is another spin-off from computer vision research, though the basic techniques have been around in various guises since the 1850s. Probably the most well-known company working in this particular field is France's Realviz, whose technology is based on work conducted by the ROBOTVIS group at INRIA, The French National Institute for Research in Computer Science and Control. Its *ImageModeler*, which also shares estimation algorithms with the company's *MatchMover* and *Stitcher* products, recovers 3D camera parameters and 3D point co-ordinates from 2D point correspondences.

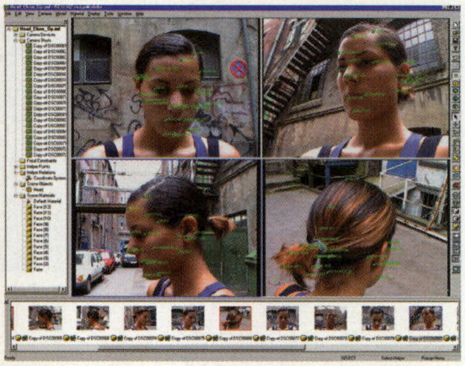
"This process relies on the fact that the imaged 3D points belong to a scene or an object which has the same 3D shape when imaged in the different pictures," explains CTO Luc Robert. "The optimisation process finds the set of 3D point and camera parameters such that, when projected on the recovered cameras, the recovered 3D points minimise in all images the distance to the 2D point entered by the user. In *ImageModeler*, the user then starts interactively building 3D shapes in an image-oriented way: he or she can observe the 3D elements from the same viewpoint as the ones of the images, and align them to the image."

The next stage, texture extraction, is also automatic. First, *ImageModeler* runs through an unfolding process that takes the 3D surface and finds a way of mapping it onto a plane which minimises the deformations ("Thinking of edges as pieces of elastic material, it minimises the tensions," explains Robert). Then, the texture map is filled by combining the input images with the correct deformations, the software selecting the views which have the best visibility over the surface patch for each pixel.

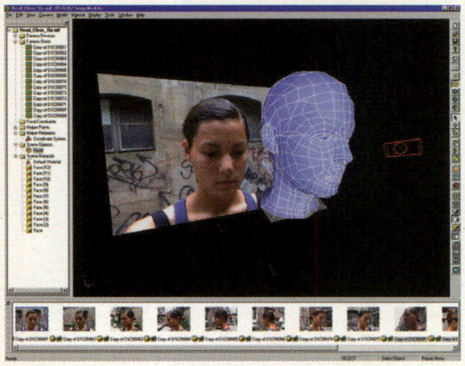
It's clever stuff, though in some companies at least is causing the sort of ire that motion capture, once described as 'Satan's rotoscope' at a particularly feisty Siggraph panel session, did on its introduction. "The 3D community simply rejected the idea of image-based modelling," says one top facility 2D man candidly. "The 2D community rejoiced when it came out though, and all the testing we've done with it has proved to be a success when it was driven by a 2D application or a 2D need."

Crowd replication

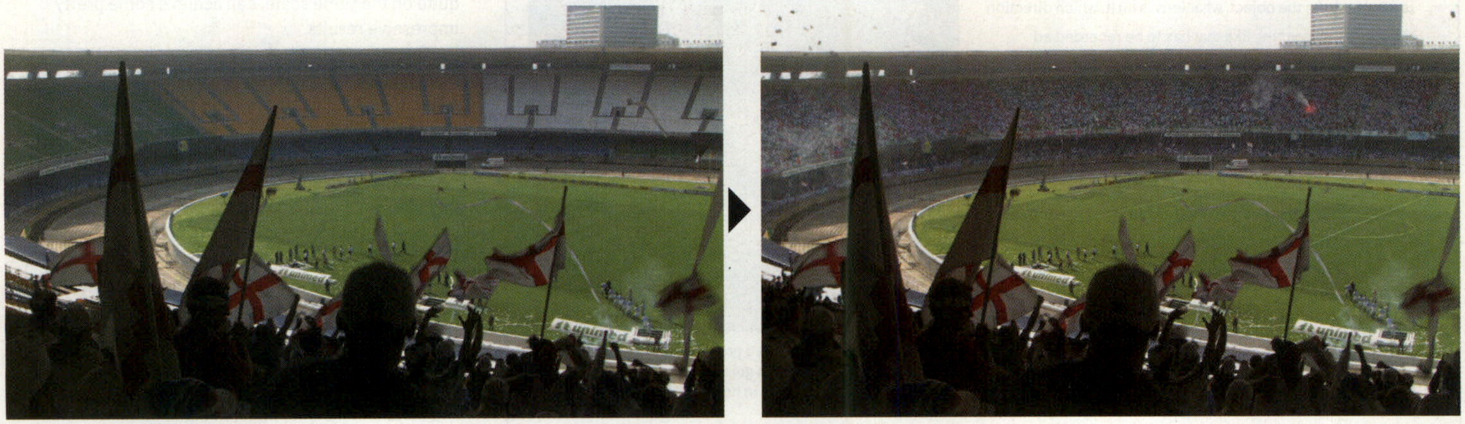
3D is not being left completely behind, with crowd replication in particular gaining centre stage attention in the build up to the release of *The Lord of the Rings*. Previously, crowds have been generated ➤



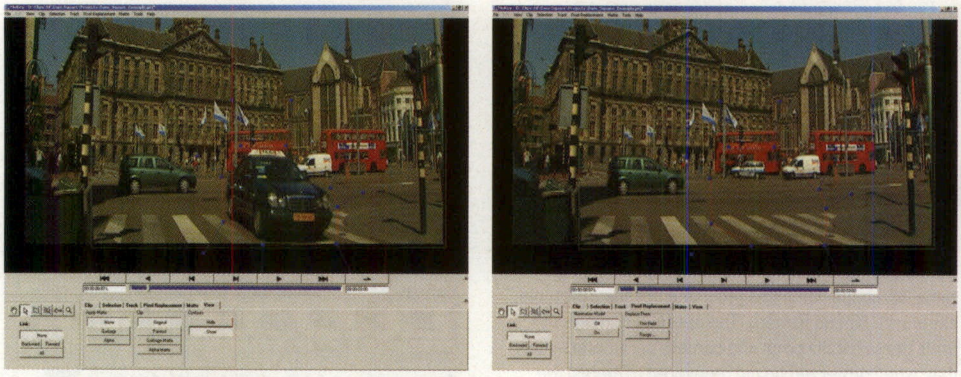
A screenshot showing RealViz's *ImageModeler* in operation. Markers have been placed on the model's face in this instance to help the software find reference points.



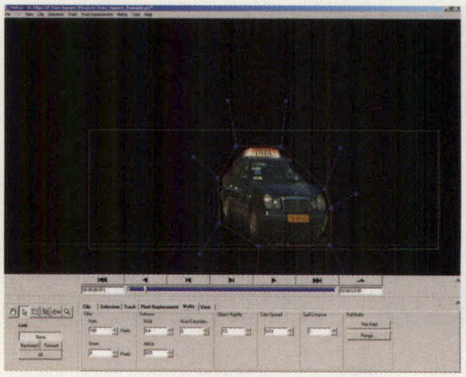
The final stages of extracting geometry from a scene. According to Realviz's Luc Robert, *ImageModeler* can be used to create '*Matrix*-like' timeslice effects using a mere 10 cameras.



Crowd replication on *Mike Bassett: England Manager*. MPC used 2d3's *boujou* to comp in an entire 2D crowd for the entire Wembley sequence.



The *Mokey* motion keyer removing a minicab from Amsterdam's Dam Square. Providing the entire background is exposed in the sequence, the process is entirely automatic.



As part of its operation, *Mokey* outputs a travelling matte of the removed object, perfect for comping into another scene.

using 2D. In the Colosseum shots in *Gladiator*, for example, Mill Film only used detailed, motion captured 3D models to move the velarium during the 'blimp shot', while for the crowd itself (around 30 extras) were filmed in front of green screen with keyable colours on their togas. These images were mapped onto flat cards positioned in front of every seat in the Colosseum, with offset actions, varying toga colour and different performances recorded and catalogued so that crowd reactions could be choreographed in any pattern necessary. A similar technique was used by Lola Post and Smoke & Mirrors to populate the immense arena in the BT Stadium ad with three million people, each of which could have been zoomed in on by the director if he had so desired.

For *The Lord of the Rings*' stunning-looking battle scenes though, a true 3D solution was needed and New Zealand effects house Weta Digital, which is producing the lion's share of effects for all three films in the series, created its own proprietary software package called *Massive*.

"*Massive* is a behavioural simulator," explains Stephen Regelous, who heads up the Massive department in Wellington. "It's used to simulate the behaviour of individuals as 3D computer generated AIs or 'agents'. It can handle tens of thousands of individual agents on a single processor at once. Crowd behaviour is emergent from the interaction of many of these agents.

"Each agent consists of a body defined largely by its skeleton, and a brain, which is a hierarchical artificial intelligence network. Most of the agents that we have created so far are humanoid, but *Massive* can be used to simulate pretty much any kind of creature. The process of creating a humanoid agent goes something like this: specify capabilities; design a motion tree; build a skeleton; motion capture; import motion capture data; build a brain. Parallel to this work is the creation of the geometry and shaders for the agent, which come together with the motion during the render."

While many top effects houses have developed their own proprietary systems for crowd simulation (and indeed, there is talk of Weta licensing *Massive*), it's not just confined to the extreme high-end. With *character studio 3*, for instance, Discreet introduced its new Crowd feature which, while not quite on the same scale, can achieve some pretty impressive results.

"Crowd is really cool at working out the placement of thousands of characters," explains Discreet's EMEA Animation Business Manager, Keith Russell. "The crowd simulation routines work separately to the animation ones, so you can say you want to put in *character studio* Bipeds and attach them to certain node points, then animate them or have mocap on them, or not use Bipeds at all but use bees and have 10,000 bees all swarming towards the camera. The Crowd bit is the location points, the motion paths, and you can attach anything to the motion path."

New technology

Russell promises more pre-sets in future iterations of Crowd, cutting down the set-up time and enabling

Pre-visualisation

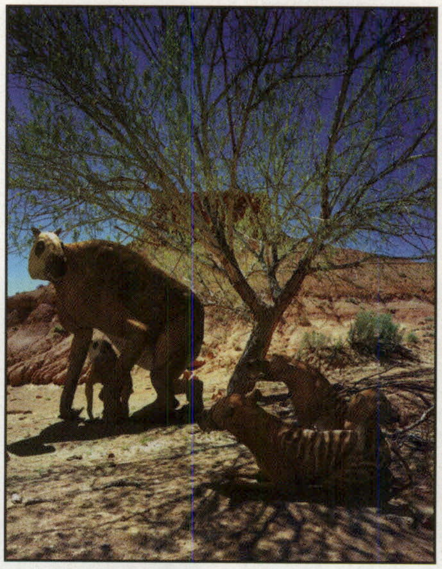
One of the main trends in effects work at the moment is that towards pre-visualising scenes. Post production is not a cheap process – a suite running Discreet's *inferno* will cost you £700 per hour, while a 3D animator is charged out at roughly £1000 a day, so any work that can be done up front to make the process smoother is a good idea.

Jasper James is producer of the BBC/Discovery co-production, *Walking with Beasts*. "We had a vfx supervisor on every shoot and someone else to take every bit of data down too," he says. "We stick the camera down, take the shot, then we have to work out how high the camera is, how far from the object, what lens is on it, which direction the sun is... everything like that has to be recorded ad nauseum to make sure it all works later on."

For film work, shots are planned with military precision, though there is scope for changing things on the spot if you can convince the director.

"People would take *3ds max* on location, take a couple of digital stills, make a biped model, bung some pyramids or whatever in the background, and then were able to show the director on set roughly what the CG was going to be able to do or not do," says Keith Russell.

"With *combustion 2* now, which you can put on a decent laptop like the new Apple Titaniums, they can show pretty much everything they can do in *inferno*, sit next to the director and say 'We'll make this blue, set that head on fire, take that CG model and whack it in the back there' and so on."



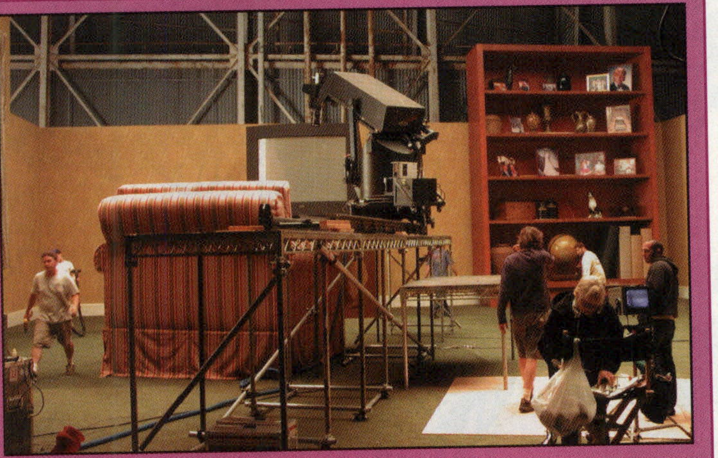
Walking with Beasts. Detailed pre-vis work was necessary if the Framestore 3D team was going to be able to complete the vast amount of CG shots in time and on budget.

World in Motion

Despite the rise and increased accuracy of 3D tracking, there is still very much a role for motion control in current effects work. Indeed, the majority of the effects shots in *Harry Potter and the Philosopher's Stone* contain motion capture elements, because the more CG there is in a scene, the more you need to be sure of your camera position. Moco rigs are essentially cameras mounted on a robotic arm which runs in turn on tracks, all controlled to millimetre perfection by computer. That camera track can either be recorded and output into 3D software, or programmed from 3D software using special plug-ins.

Multi-layering is perhaps the most obvious use for the technology, where a camera move is programmed into the machine and different elements of the picture are shot with the same camera movement and the resulting mattes layered in compositing. Animation, particularly involving claymation and similar techniques, is another popular use, while complex shots such as swift focus pulls or contrazooms are also fairly easily achieved.

Pre-visualisation is becoming increasingly important too, vfx supervisors being able to build exact virtual models of studio sets and run dynamically-accurate moco rigs through them to check lines of sight and that the rig won't go crashing through any scenery. They can then start working on the CG elements of the scene in confidence that the whole thing will stitch together even before the shoot commences.



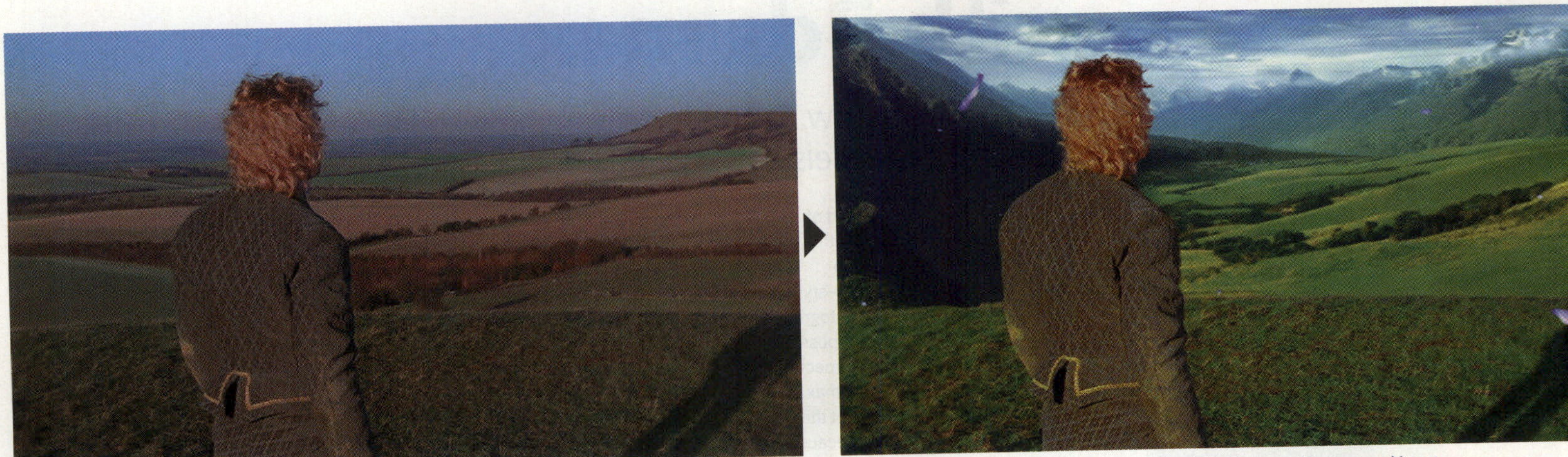
A Mark Roberts Milo motion control rig in action. The Milo is portable and can be set up on set or on location in a couple of hours.

users to just pick up the program and run with it. Elsewhere, there's plenty more to come out of computer vision yet too as the companies set up to take advantage of the original research start cranking out vfx specific algorithms.

Most of the matchmovers will be adding an automatic capability, as well as routines to deal with more variations at the camera end of things - focus pulls for example. Realviz's Robert says of his company's immediate future direction: "Recovering 2D or 3D shape animation, lighting or material properties for smoother integration of real and virtual elements are definitely tracks that we want to follow."

2d3 has even been conducting some ad hoc market research, showing trade show attendees video demos of new technology it's working on. Photogrammetry crops up, as does auto rotoscoping — a bus disappearing as it goes down Oxford High Street, for example — but what is new is its up-rezzing feature. Using this, a camera pans around a scene until everything has been shot, after which, multiple frames are analysed to produce the new array of pixels. Uses stretch from creating film res backplates from DV footage to the creation of high-quality texture maps, to blowing up CCTV footage to reveal a sharply outlined car lurking in the bushes.

Final word goes to Dr Nick Glazzard of 5D Solutions, a company whose *Monster* plug-ins for various platforms have been instrumental in applying computer vision techniques to the effects industry. "There is no doubt that computer vision-based techniques will be at the heart of much that is technically new," he says. "A great deal has already been done with slow mos, 3D camera position recovery from image sequences, motion keying, clean plate generation and some 3D object reconstruction already being commercially available in very useful forms. How much further can this go? In theory up to completely automated 3D scene reconstruction with super resolution textures. In practise though we may be waiting a while for a sufficiently robust set of algorithms to be developed." ca▸s



Another *boujou* before and after, this time from Hallmark's *Jack and the Beanstalk*. "Typically we would set it off at 11am in the morning and have the solved shot by lunch time, with no need for any tweaking at all," comments Jim Henson's Creature Shop Technical Director, Alex Wuttke.

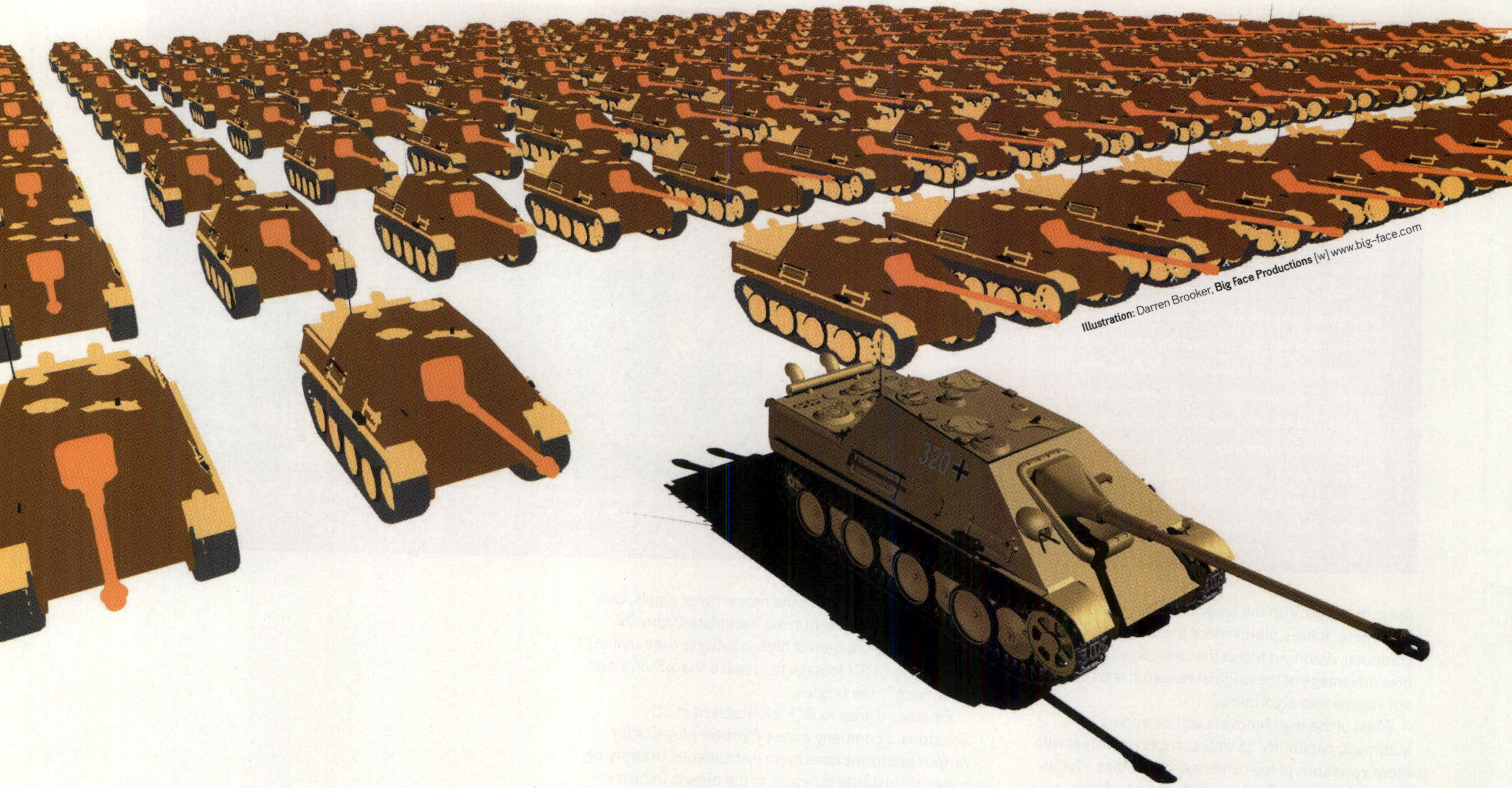


Illustration: Darren Brooker, **Big Face Productions** [w] www.big-face.com

Camera mapping with 3ds max

We show you how to create a stunningly lifelike effects scene using a photo, 3D models and *3ds max 4*…

You don't need the kind of money associated with Hollywood movies to produce blockbuster-style effects: in fact with a simple photograph as a background plate, it's quite possible to produce some jaw-dropping special effects. Though we're using *3ds max 4* here, you should be able to adapt this tutorial to most 3D packages, because it relies heavily on one technique: camera mapping.

Camera mapping enables you to apply the same texture map to 3D objects as your background image, meaning that you can rapidly build up a 3D set from your plate, using this for your textures too. With this quickly constructed, you then have a 3D environment that is indistinguishable from reality, or from a photograph at least!

With a little attention paid to the plate's lighting, you can begin to introduce 3D elements — in this case two tanks and several planes — and bring your still image to life. The finished product will look extremely professional on your showreel, yet these polished results belie the simplicity of the core camera mapping techniques required for such shots. Though this tutorial uses a plate straight out of a photo album, the results look like they've been composited over film footage, and once assembled, the sky's the limit for what you can do with them.

Files on disc

You'll find all the files you require on the cover CD, in the Tutorial\Max folder. Expertise supplied by Darren Brooker, award-winning freelance animator at Big Face Productions
[e] darren.brooker@big-face.com
[w] www.big-face.com

Part 1: Creating a 3D set

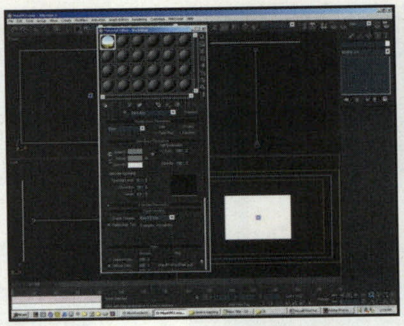
We'll begin by setting up the backdrop and our camera, then model the foreground of the shot and use the Camera Map Modifier to create a quick 3D set…

Soft Selection

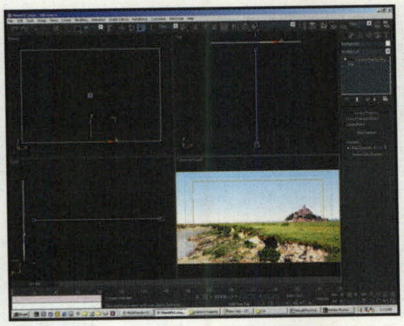
When Soft Selection is turned on, your vertex selection isn't a hard-edged one. Instead, *max* makes a vertex selection behave as if surrounded by a magnetic field. Unselected sub-objects within the field are drawn along smoothly while you transform the sub-object selection. The effect diminishes with distance, fading across the surrounding unselected vertices. This makes organic modelling tasks much easier.

Anti-aliasing

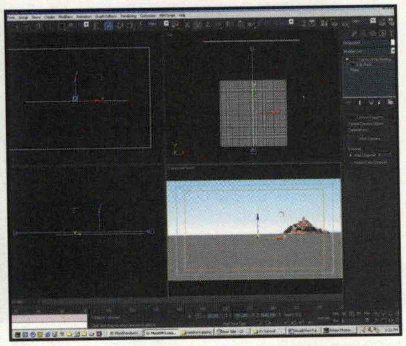
While anti-aliasing provides superior results, it produces inconsistencies when rendering objects that are supposed to match the environment background. This is because the anti-aliasing filters don't affect the background by default. You can turn on background anti-aliasing in Customize> Preferences > Rendering> Background Antialiasing>Filter Background. To correctly match an object's map to an unfiltered background image, you need to use the Plate Match/MAX R2.5 filter so the texture isn't affected by the anti-aliasing.



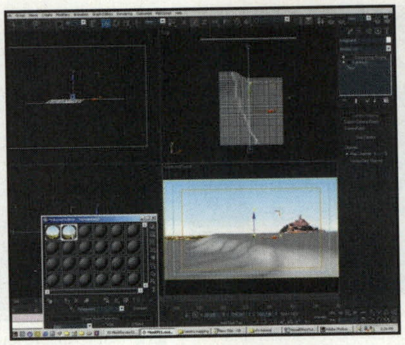
1 In the Front viewport, create a box whose height is roughly two-thirds its width. Right-click it, choose Properties, and uncheck Cast Shadows. Now create a target camera in the Top viewport and centre the camera and its target on the centre of the box. In the Materials Editor, in a new material slot, choose MontPlate.jpg as your diffuse colour map and make this material 100 per cent Self-illuminating.



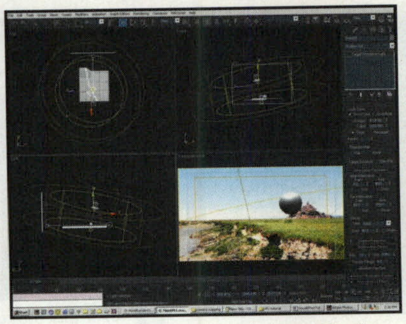
2 Make sure that the Specular Level and Glossiness are set to 0 and apply this material to your backdrop. Now Change the Perspective viewport to the Camera View. Add a Camera Map Modifier to the backdrop and in its controls, pick the camera. Now move the camera a considerable distance away from the box and use the Scale tools to size this up until its edges disappear comfortably beyond the Camera View.



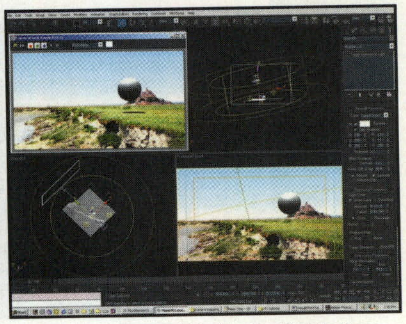
3 Create a plane in the Top viewport that is almost as wide as the box and stretches two-thirds of the way from the camera to the box. Now move it upwards until its far edge roughly matches the horizon. Increase its Length and Width segments to about 40–50 in each direction before adding an Edit Mesh Modifier, followed by another Camera Map Modifier, again picking the camera.



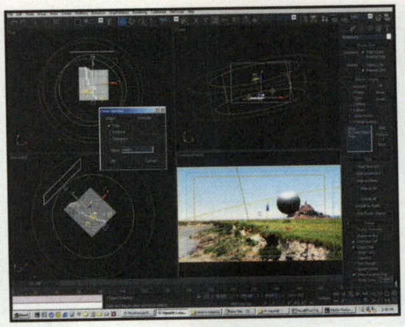
4 Drag to copy your backdrop material to another slot, rename these Backdrop and Foreground, and apply the latter one to your plane. Select the plane, and at vertex sub-object level, push and pull groups of vertices around to roughly match the foreground terrain, using Soft Selection to get nice organic deformations. Don't worry about matching this exactly: it doesn't need to be perfect.



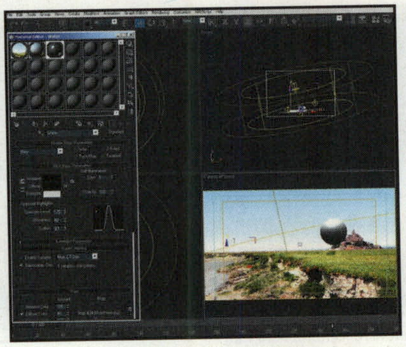
5 Open MontPt1.max from the cover CD where this modelling is complete. Create a sphere floating over the grassy patch to the right, and create a Target Direct light representing the sun, which as you can see from the foreground shadows, is coming from almost overhead, slightly to the left and towards the camera. Give this light the very slightest hint of blue and change its Multiplier value to 1.1 and its Shadow Map size to 2,048.



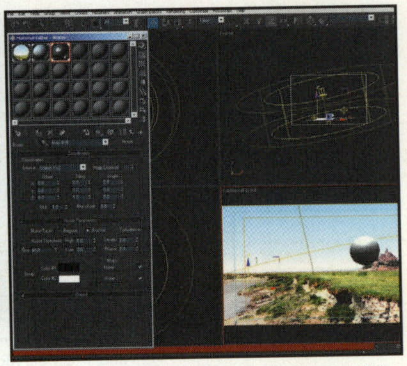
6 Change a viewport to the direct light's view and adjust the Hotspot and Falloff Cones to cover the entire plane. Now bring the Foreground material's Self-illumination down to 0 and render the scene, adjusting the light's position until the shadows appear to match those of the scene. Now add two Omni Fill lights at the bottom-left and bottom-right of the foreground plane, to lighten the unrealistically harsh shadow.



7 These should have Multipliers of 0.1 and 0.2 respectively, be pale green and have their Specular checkbox unchecked to prevent them from creating highlights. They also shouldn't cast shadows. To create the water as a separate element, clone a copy of the foreground plane, delete the Edit Mesh Modifier, and move it into place just above the foreground plane over the water, reducing its size (and segments) to fit.



8 In a blank slot in the Material Editor, change the Ambient and Diffuse colour swatches to Black and up the Specular Level and Glossiness to 125 and 40 respectively, turning on the Sampler in the SuperSampler rollout. In the Diffuse map slot, select the MontPlate.jpg image, setting its Amount to 45, and choose a Mask Map in the Reflection slot. Rename this material Water.



9 Place the MontPlate.jpg image in its Map slot, and a Raytrace Map in the Mask slot. Back at the top level, in the Bump slot, specify a Noise Map, changing its Noise Type to Fractal and its size to 40. Turn Animate on and enter –1.5 for the Phase value at frame 0 and 2.8 at frame 300. Now turn Animate off and apply this material to the water object. ➤

Part 2: Bringing in the 3D

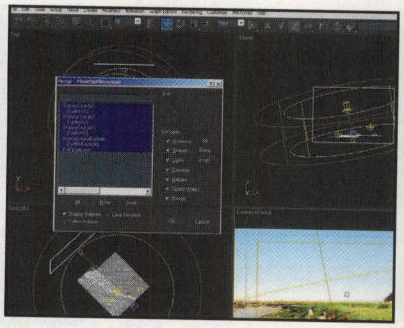
With our set complete, we'll use XRefs to bring in some pre-animated 3D content and set about integrating this realistically with what we've built so far…

Controllers

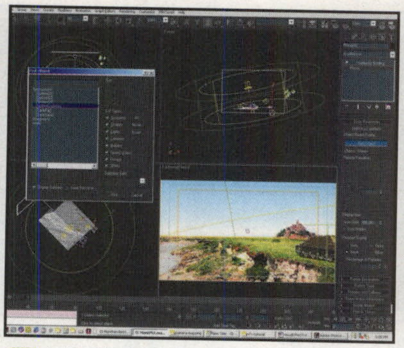
All animation in *3ds max* is performed through Animation Controllers, the most common of which are those for move (position), rotate, and scale, and also referred to as Transform Controllers. You can see which specific controllers are assigned to each track by turning on the controllers display in the Track View (right-click Filters in the Track View toolbar, and choose Controller Types from the list). The controller names appear beside the tracks to which they're assigned.

Particle Systems

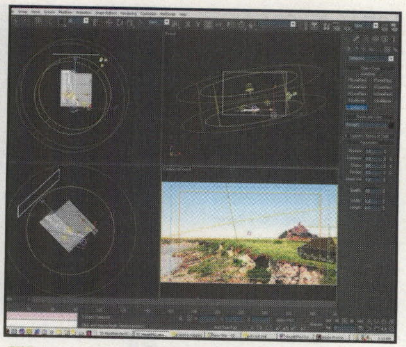
Not only useful for smoke and water, certain Particle Systems are also suitable for animating explosions, and the PArray is particularly well suited, especially when combined with the PBomb space warp, which creates an impulse wave to blow up a Particle System.



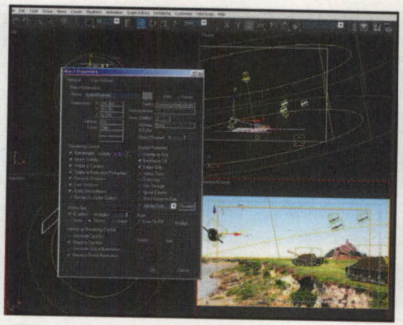
1 Open MontPt2.max from the cover CD. Go to File>Merge and select the MontTanks.max file. Select all objects and OK this, before repeating this for the MontSpitfires.max file, again selecting all of the scene's objects. If you scrub through the Timeline you should now see the animation attached to these XRefs (You might have to hide spitfires and tanks and just watch their dummy objects though).



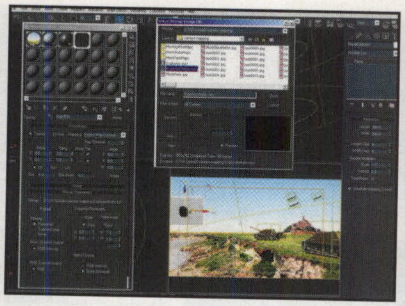
2 In the Create>Geometry panel, choose Particle Systems from the dropdown and select PArray. Click and drag a PArray gizmo in any viewport. In the Basic Parameters rollout, click Pick Object, select SpitfireExplode and choose Mesh for the Viewport Display Group. In the Particle Generation rollout, set Emit Start to 150, Life to 45, Display Until to 195 and change the Speed to 5.



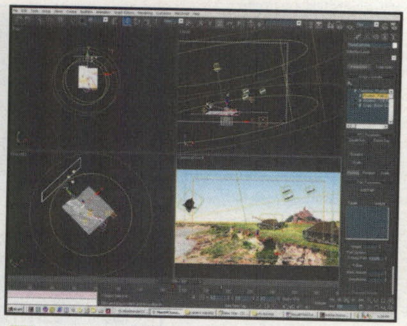
3 Now in the Particle Type rollout, choose Object Fragments, with a thickness of 1. Choose Number of Chunks and set the Minimum to 200. Also, under Material Mapping and Source, select the Picked Emitter radio button. In the Rotation and Collision rollout, set Spin Time to 50 and Variation to 10. In the Create panel, under Space Warps within the Deflectors dropdown, pick the Deflector button.



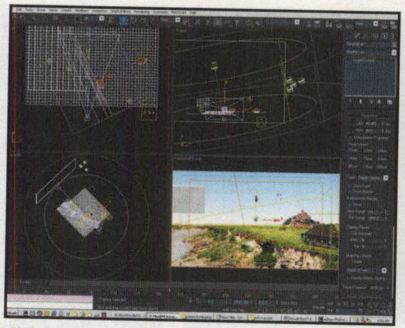
4 Place three of these objects in the Top viewport, aligned, sized and angled to cover the whole area where the particles hit the foreground. (Open MontPt3.max if you're not sure.) To make the original plane disappear, go to frame 151 and turn on Animate. Select SpitfireExplode, right-click and choose Properties, setting the Visibility spinner to 0. OK this dialog and turn off Animate.



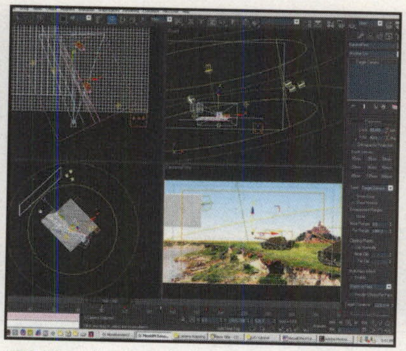
5 Right-click the key at frame 0 under the time slider, choose SpitfireExplode: Visibility and change the Out interpolation to Step. Repeat this for all the other Visibility keys. Create a plane primitive in the Front viewport of Length 360 and Width 500. In a new slot in the Material Editor, set the Glossiness to 0, Self-Illumination to 100 and put Explosion.mov from the CD into the Diffuse slot and ExplosionMatte.mov into the Opacity slot. Rename this material Explosion.



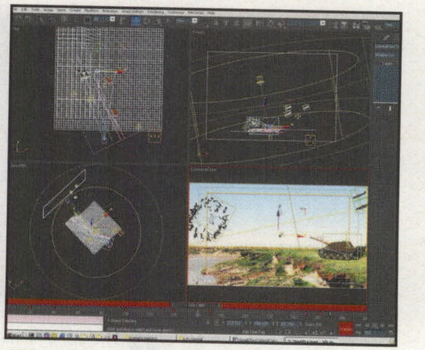
6 In the Time rollout, set the start frame to 148 and the End Condition to Hold. Repeat for the Diffuse Map. Now pick Align to View from the Tools menu, ensuring that Align to Z is selected. Right-click the plane and in the Properties dialog uncheck the Cast Shadows and Receive Shadows boxes. Open the Motion panel, press Parameters and select the Path Controller. Now Assign a Path Constraint Controller.



7 In the Path Parameters rollout, hit Add Path and select the XRef PathExplosion object. In the area below the time slider, move the first key from 0 to 150 and the second from 300 to 194. Now select the scene's camera and clone a copy, renamed CameraFree. Change its FOV to 40 degrees and move its target object in the Top viewport until it's level with the furthest tank. At frame 40, hit Animate.



8 Move the target in the CameraFree viewport up and towards the first Spitfire, as far to the right as is possible without the Camera Map becoming apparent (don't worry yet about going over the top of the backdrop). At frame 100, move the target left to follow the Spitfire and down level with the top of the far moving tank, again within the bounds of the Camera Map.



9 Drag the key from frame 0 to frame 20 and copy this to frames 170 and 250. At frame 120, change the Camera's FOV to 30 degrees and at frame 170 change it to 45. Move the key from frame 0 to 100. Shift and drag a copy of the key at frame 120 to 160. At 140 move the Target as far left as possible, and at frames 120 and 160 move it right to just avoid the Camera Map breaking up.

Part 3: Polishing the animation

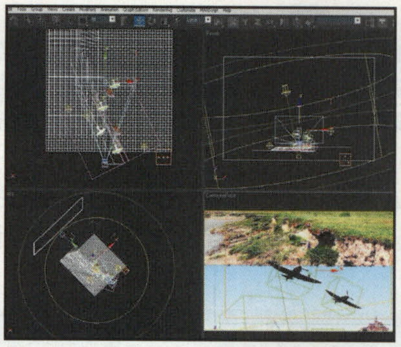
At this stage we'll need to add explosions, blur and film grain, and some camera noise to shake things up a little…

In and Out values

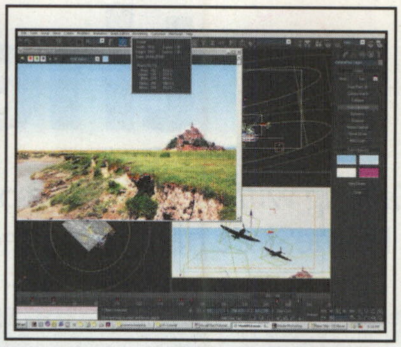
The different ways in which an animation can be interpreted between its keyframes is controlled through In and Out Interpolations. Slow and Fast are used to ensure smooth natural looking transitions, but the Step value achieves a jump from one value to another, which is what we wanted when the exploding Spitfire disappears, and the Linear Interpolation is useful for making very straight sections of animation, useful for the camera movements.

Film Grain

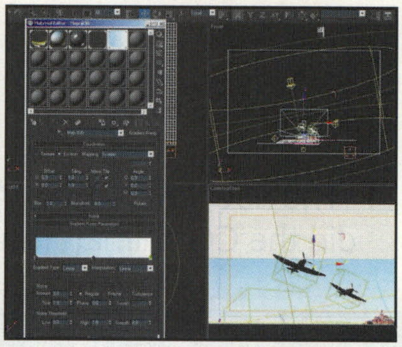
As our source image was a scanned photograph, the 3D elements rendered on top of this would look too clean cut and unrealistic without some kind of treatment. Film Grain helps to achieve this by making everything a little grainy. When applied, the effect automatically randomises to create the look of moving frames.



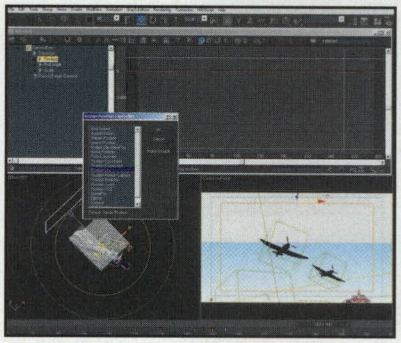
1 At frame 262, move the target up so it's centred on the leftmost Spitfire and at frame 270 move it up and to the right so that there's a whole Spitfire just visible on the right. Change all of the Outs and Ins for these keys to Straight. (MontPt4.max from the CD contains this completed camera animation, in case you want to compare yours or replace it.) Next we'll mask off the sky.



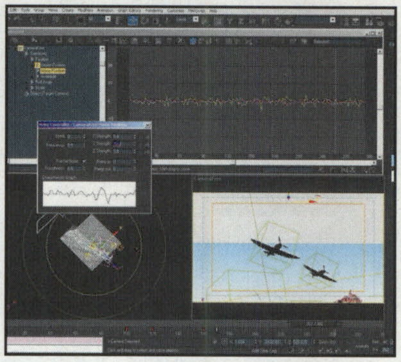
2 Put MontPlateMatte.jpg into the backdrop material's Opacity slot and uncheck the Tile boxes in the Coordinates rollout of both this and the Diffuse Map. In the Utilities panel, pick Colour Clipboard. Choose File>View Image File and select MontPlate.jpg. Right-click a colour at the very top of the sky and drag this from the swatch in the top menu bar to one of the clipboard slots.



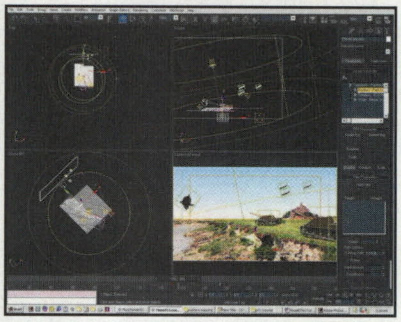
3 Grab a mid-sky colour and one from just above the horizon. In Rendering>Environment, choose a Gradient Ramp for the Environment Map. Drag this to an empty slot in the Material Editor, and in the Gradient Ramp Parameters rollout, right-click the first flag to edit its Properties. Now drag the colours (in order) from the clipboard to assign them to the ramp.



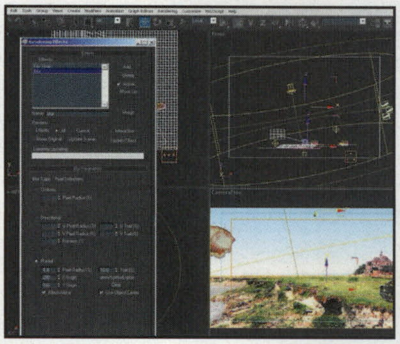
4 In the Coordinates rollout, enter -90 in the W Rotate field and change the Mapping to Spherical Environment. Select the CameraFree object and right-click in a viewport, choosing Track View Selected. Expand the Transform branch and highlight the Position label. Click Assign Controller from the top toolbar and choose Position List, which enables several controllers to be assigned.



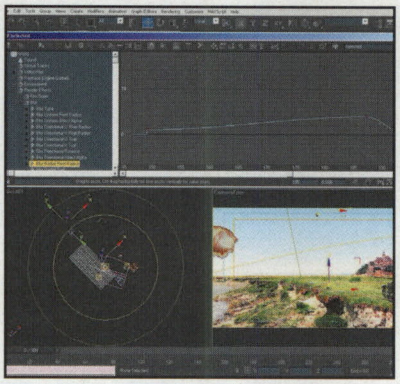
5 Now expand the Position track and highlight the new track labelled Available. Assign to this a Noise Position controller, changing the X, Y and Z Strength values to 5, 10 and 5 in the dialog that appears. From the Apply Ease Curve flyout, choose Apply Multiplier Curve and expand the Noise Position track, highlighting Multiplier Curve.



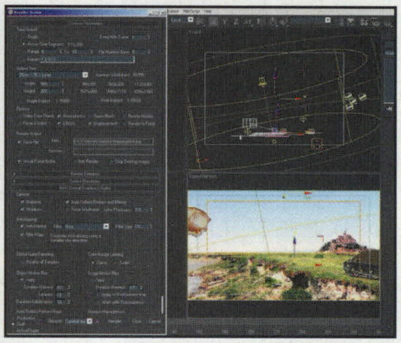
6 Now use the Add Keys function to add keys at frame 0, 150, 188, 200 and 300. Their values should be 0, 0, 4.0, 0.5 and 0. Change the In and Outs for each key to Step, Slow or Fast to get the graph looking initially flat, with a smooth rapid peak followed by a soft decrease back to 0. Select the foreground and background objects and choose Edit>Object Properties, checking the Object Motion Blur option before pressing OK.



7 Now add some Film Grain in the Rendering>Effects dialog, choosing a grain of 0.1 and leaving Ignore Background unchecked. In this same dialog, add a Blur and click OK. In the Blur Type tab, choose Radial Blur, changing the Pixel Radius (per cent) to 1.0 and the Trail (per cent) to 10. Check the Use Object Centre box, and hit the button labelled None then select the DummySpitfireExplode object.



8 Turn on Animate and at frame 0 set the value to 0, at 150 set it to 1.0, at 188 set it to 4 and at 195 set it to 0. Turn off Animate and in the Track View expand Render Effects>Blur and select the Size icon. Change the In and Out values for these keys to achieve a graph the same as the one shown.



9 Finally, the render, which should have a wide aspect to give it a sense of cinema. Make sure the Object Motion Blur is turned on, with Duration of 0.5 and 10 Samples and Duration Subdivisions. Ensure also that the Disable all SuperSamplers checkbox is unchecked. Now just sit back while *max* renders out your creation, or simply watch the mono.mov file on the CD. ca•s

Bring on the beasts

The new BBC series, *Walking with Beasts*, is on our screens and looking amazing. How did the CG animators at FrameStore handle the move from T-Rexes to sabre tooth cats?

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All images © BBC 2001

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1999 saw *Walking with Dinosaurs* become the most popular TV science documentary in the history of the BBC. The follow-up series, *Walking with Beasts*, moves forward to 1 million BC to more fuzzy creatures such as mammoths, sabre tooth cats, and even early man.

Once again, successful London outfit, FrameStore, was called upon to apply its considerable skills to the immense project. So the company has done it all before, there are fewer species to work with and everyone knows how these creatures move – in that case, why was *Walking with Beasts* an even bigger challenge for FrameStore's CG team?

As long as it may seem since *Walking with Dinosaurs* was on our screens, the team only had a break of four months before starting work on the *Beasts* project. Not that there was any opportunity to relax: new projects included the remake of *Jason and the Argonauts* and a mini-series for Hallmark, *Dinotopia*, due out next year.

During this time, BBC crews were already filming in locations such as Canada, South Africa, Brazil and Indonesia, finding the right habitats for the beasts and doing the blue screen and model work in preparation for the second series.

No time to breathe

"We didn't have much of a break," says Mike Milne, Director of Computer Animation at FrameStore. "We had a lot of research to do as well as change the systems to deal with mammals instead of dinosaurs. We wanted to improve on the pipeline and adjust ➤

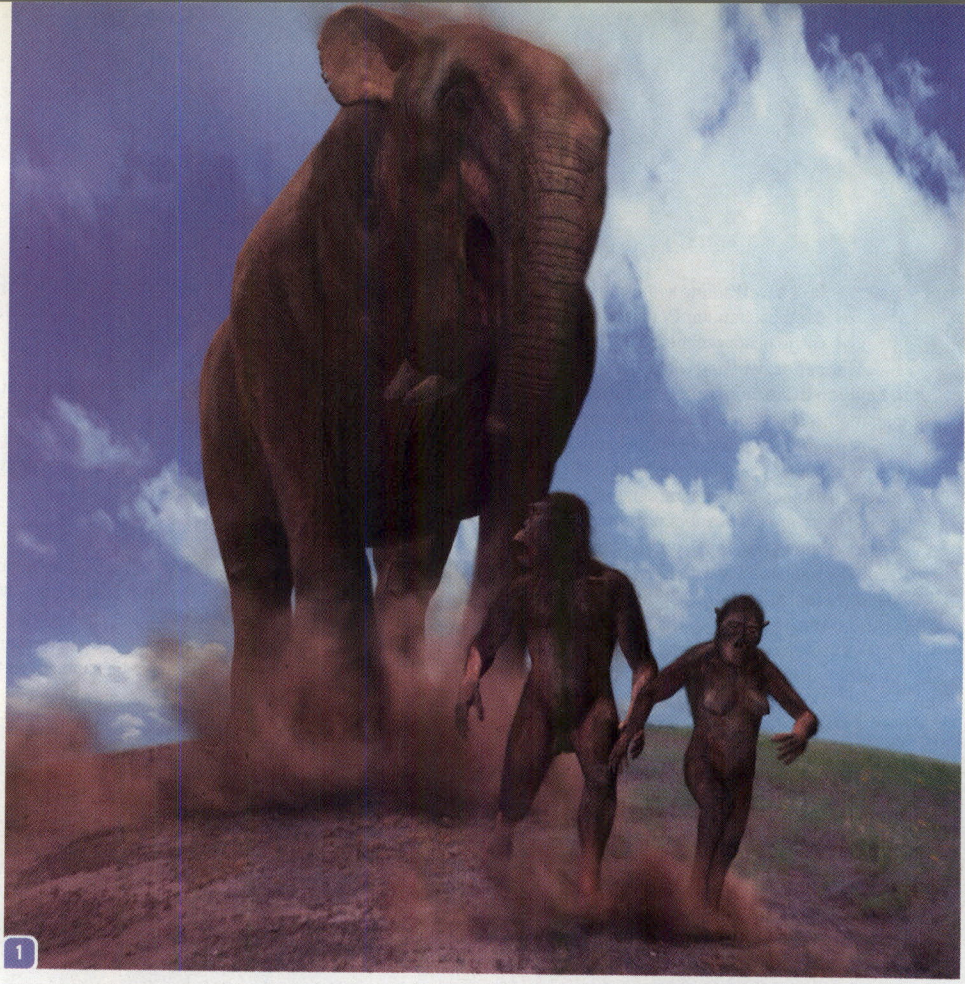
1. A pair of Indricotherium drink from a river: the modern rhinoceros was used for the modellers' reference.

2. Successful compositing places these Brontotheres comfortably in a tropical setting.

Old school workflow

The team like something to hold

"It sounds archaic but we prefer to work on tapes, passing them back and forth to each team," says Mike Davis, Project Co-ordinator at FrameStore. "We started working solely across a network but we found it took more time and was difficult to track. With tapes, we know who's got the files and we know it's the latest version." Which sounds fine until you see that the team is spread across two central London buildings. The scanning, modelling and animation all happen in the FrameStore floor of the CFC (Creative Film Company) building on Wells Street. But the compositing teams with their huge Henry suites and the largest graphics tablets you've ever seen, reside in the head office on Noel Street, surrounded by the company Scalextric set and designer coffee bar.



1. A non-woolly ancestor of the elephant, the Dinotherium, chases off two Australopithecus.

the creature set-ups to cope with the differences such as fur." Not only are dinosaurs distinctly lacking in the cuteness factor, they're also fur-less, something that woolly rhinos and big cats have in abundance. Specialist animators were brought in to work solely on the fur systems: just one of the requirements which almost doubled the CG team for the second series.

Despite bringing in a wealth of new hardware including 30 render boxes, compared to the seven used in *Walking with Dinosaurs*, the software side of the operation remained more or less unchanged, with *Softimage|3D* being used as the main animation tool. "The system was already set up and we were happy to stick with it. The surprises for us were all in the complexity of the animation, not on the technical side. It all came down to animator skill," says Mike.

Elephant with a fat back

They may look more familiar but mammoths and sabre tooth cats are just as extinct as the Velociraptors and T-Rexes of the previous series and in some ways even harder to recreate, despite their similarities with today's elephants and lions.

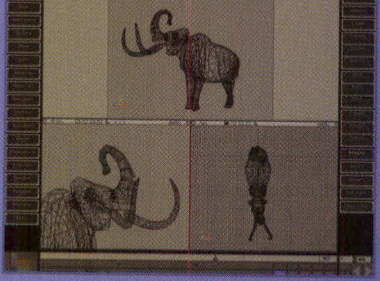
"A lot of the animals are skeletally the same, so the animators have a good reference point. But it means that the viewer is much more critical and anyone can spot when its movements or expressions are wrong. The mammoth is basically an elephant with a lump of

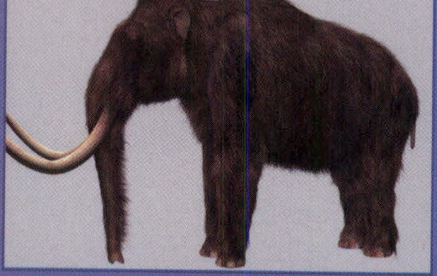
The mammoth task

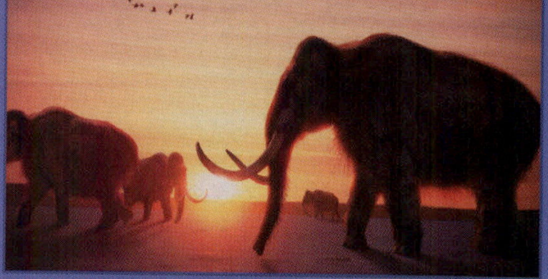
Someone call the RSPCA

Mammoths walk around different environments in the series, but one particular scene proved tough for the animators. "We had a group of Neanderthals chasing a group of mammoths off a cliff with flaming torches," says Max Tyrie, Lead Animator. "As you can imagine, animating the falls and landings of the creatures was very interesting."

However, Mike Milne, Director of Computer Animation, is most proud of the mighty woolly mammoth. "Although it was one of the easier mammals to animate, its appearance is spectacular. A lot of time went into getting the right effect for the fur. You look at it and think 'that's a mammoth,' before you remember that no one has ever actually seen one."







fat on the back and the sabre tooth cat is similar to the lions of today, whereas with dinosaurs, no one knew what to expect."

Aside from the challenge presented by fur, there are many things that wobble on a mammal such as fat, muscle and hair. Even armpits hadn't been tackled before by the team. Enveloping skin, where skin and fat folds as the animal moves its limbs was also a new issue. "Mammals move their limbs to extremes much more than the dinosaurs, especially primates. That's not to say dinosaurs didn't, just that we never made them. You could hide a lot behind a dinosaur's leg."

With so many considerations, it was important to reduce the workload wherever possible. The team had to cut corners where it wouldn't show. For instance, herds of mammoths in the distance weren't given fur, just a coloured texture. "I think we got away with it," says Mike. "We didn't do billboards this time – plains of animated creatures which featured a lot in *Dinosaurs*. We didn't seem to need them."

The muppets

Animatronics – specially prepared scaled models – played a more prominent role in the production of the last series, but didn't feature so strongly in the finished programs, acting more as a a back-up. This time around, models proved useful for close-up shots, but the emphasis was mainly on CG creatures. "We found we could get much closer shots with CG than we thought. Also, the movement of the models never convinces," says Mike.

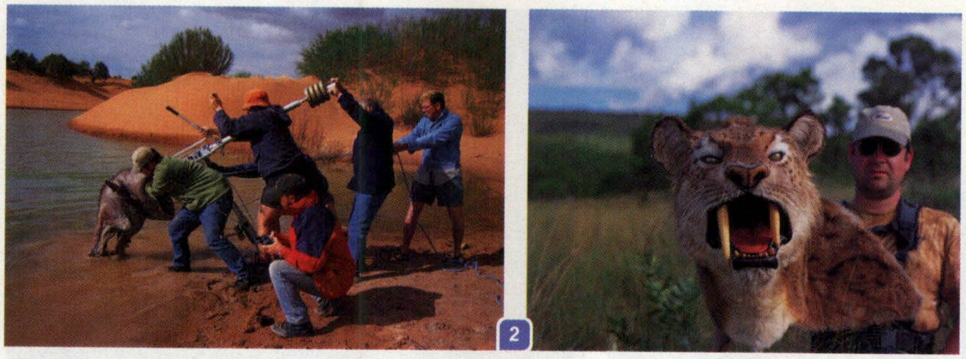
That's not to say Crawley Creatures' hi-tech muppets didn't come in useful. "We recognise that it's pointless simulating the insides of mouths, close-ups of eyes, or tearing of flesh in a computer. Although you can do it, it takes ages and costs a fortune. An animatronic takes hours rather than days." The models also came in useful for simulating fur. "Close-ups of fur in CG is a gamble, it doesn't always come out right. Animatronics are invaluable for that."

The CG beasts began life as scaled maquettes, made by professional sculptors, based on the details, sketches and bone structures provided by the palaeontologists. Thirty of the models were made in all and the sabre tooths and giant birds now stand proud in the FrameStore offices. Sean Varney was responsible for the high-resolution scans that kick-off the animation process. With each creature, the palaeontologists debated the structure and proportions of the creature before deciding on the final shape to be cast by the sculptors. "It doesn't have to be done this way but using the maquettes means that no one can come back to us and ask for changes unless they want to pay for a remodel. With CG models, people are forever requesting tweaks which can take up a serious amount of time," says Sean.

The fur-less maquettes were first scanned to 0.2mm accuracy to give a representation of the animal stripped down to the skin. Next, a layer of clay was added to the model and scanned again to provide a guideline to the changes in thickness when fur, feathers or scales were added. These incredibly dense meshes were then sent across the network to the modellers who scaled them down to lower resolutions for the animators to begin work on.

Dancing skeletons

The unwieldy shapes left skating around the screen with blocks for fingers and limbs were a far cry from the finished renders, but it's in this low resolution ➤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2. Animatronic versions of the beasts were made for each of the species. Close-ups were taken during filming and in the final series, the transition was almost seamless between the real and the CG models. Here the sabre tooth cat gives out a snarl while the team animates an Entelodont's hind quarters.

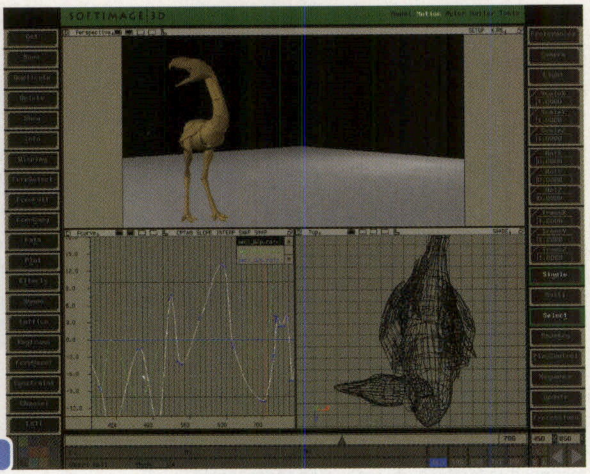
Man and monkey

A posse of ancestors...

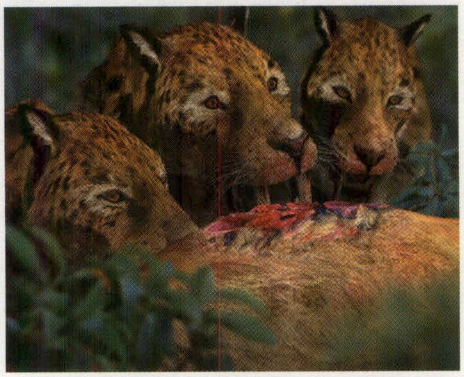
Episode four in the series follows the story of a young Australopithecus growing up after the death of his mother. These man-like creatures are perhaps the missing link in evolution and are shown in the series as neither human or ape but somewhere in between. Therefore animating its expressions, movements and behaviour took a great deal of effort. Stripes were drawn down the side of each creature's arm to make sure the limbs didn't rotate 360 degrees and escape the attention of the animator.

"This was by far the most difficult episode," says animator Max Tyrie. "Arms, wrists, even shoulders were tough to animate because they don't just pivot from one point. We had to look at chimpanzees, especially those that walk upright, to get an idea of how this hybrid creature would move."

Another challenge was the sheer number of the figures. In *Walking with Dinosaurs*, there was rarely more than one creature on screen at once. The Australopithecus lived in tribes, so with four or five in one shot, the amount of animation was intense. But the finished products got the thumbs up. "The professors we worked with were really excited. They want us to help them write papers about the creatures."



1. Big bird's bad cousin, the Gastornis, runs through the forest in search of prey. The feathers were also a new challenge for the texture team to face. The large birds, gastornis and terrorbird, were some of the animators' favourite beasts for their pure viciousness. This shows the early stages of the terrorbird's animation.



format that most of the ground work on the animations was done. Max Tyrie was Lead Animator on the project and witnessed each beast from beginning to end. "We took the b-spline patches from the modelling team and chopped them up into rigid sections until we had something we could work with quickly. All we really needed to know was where the animal was."

In the same way as *Walking with Dinosaurs*, movements were created by drawing the skeletons into the body and animating the actual joints rather than the whole creature. The team created a whole library of walks and runs for the beasts using *Softimage|3D* so basic animations could be taken as and when they were needed.

Max had to work through the storylines with the show's directors, identifying what exactly was needed for each scene and how they could save time without detracting from the story. The result was a Blocomatic, a type of animated storyboard. "We looked at each individual shot in an episode and used basic creatures floating around the screen just to get an idea of size, position and space for movement."

Then it was time to get down to business. "Once we knew what worked and were sure that the narrative had been faithfully followed through, we started replacing the block models with head turns, walks, and other behaviours." More intricate scenes such as the stunningly-realistic fight between two sabre tooth cats were worked on individually and in more detail.

The models only started to look like the real thing during the final stages, when fur and textures were stretched to fit the hi-res models, facial expressions were worked on and the creations were passed to the compositors to work their magic. "It's a very technical process that goes back and forth a lot," says Max. "No one enjoys doing it, but at the end of the project it's good to see how it works."

A new wave

The animators were able to help out the directors and contribute to the content each episode by playing with the figures and suggesting interesting shots and behaviours that could be incorporated into the script. Some of the effects and camera angles were also taken directly from actual BBC nature documentaries. Max and fellow animators had access to the entire David Attenborough archive and fellow nature presenters, exploring deserts, plains and rainforests in search of modern-day beasts.

Whereas a lot of the *Dinosaur* footage was simple and static, this time around, the filming teams refined the angles and worked with moving shots from cameras in helicopters and on wires. FrameStore even employed a full time Tracker to work on this new development, which ultimately yielded some impressive results in the finished footage.

They also experimented with lens distortion to recreate the feel of a real nature program. At one point, an Indricotherium (a rhino with giraffe-like features) sniffed the camera lens with an exceptionally realistic perspective from the large nostrils down to the tiny hooves.

Other new techniques included time-slice photography, time-ramping and slow motion. "We tried some bullet time work for fun, similar to effects in *The Matrix*. It looked great," says Mike Milne. "Also, the

Furry friends

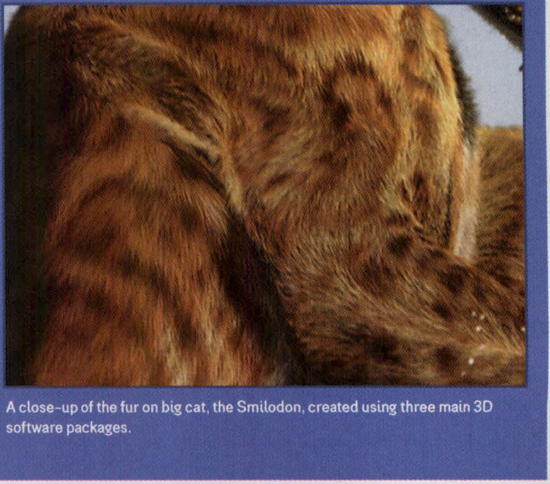
The biggest challenge of all – fur

Creating fur for the new series was a serious job, even more time-consuming than the dinosaur skins and textures. The beasts carry on average two million hairs going up to three million on the mammoths. Length, direction and thickness each had to be taken into account and the fur had to be animated on mammoths and woolly rhinos. Each hair had to follow the lay of the skin and movement of the muscle.

A complex software pipeline was used to create the impressive fur effects. Three fur pipelines managed three different lengths of hair, from short pelts to the long mammoth coats. For the short and medium hair, FrameStore's used its own combination of shaders in *Softimage|3D* and *mental ray*. The long hair also required *Maya*'s styling tools for specifying and combing the coat. After much deliberation, the animation of the longer fur was eventually done manually, something the team hopes to improve for future projects. "Next time, we'd like to get some more dynamics going – manually animating the fur wasn't very practical."

"It was a combined pipeline, everything bounced in and out," says Mike Milne. "I don't think anyone in the industry is doing fur particularly well yet, but our efforts are looking good. If we'd had more time we would have written our own fur system, but it just wasn't possible. We made do with a string and horsehair technique."

And the resulting effects are impressive, in both the animations for the series and stills for the book, the fur is detailed, fine and realistic. Extra effects such as snow and mud were also added to the coats by the textures team.



A close-up of the fur on big cat, the Smilodon, created using three main 3D software packages.

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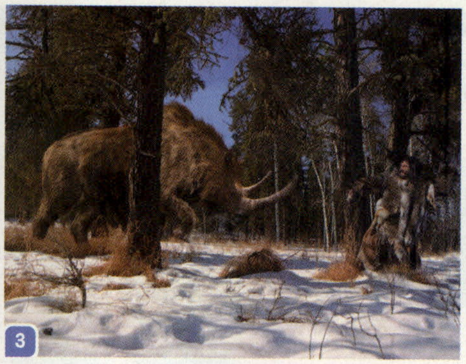

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ramping changes speed from fast to slow in much the same way as the latest pop videos. It's our way of coming up to date."

A number of modern day animals which palaeontologists decree existed at the same time as the prehistoric creatures were left in the background for many of the shots. So Max Tyrie and co's animated beasties could be seen alongside vultures, rhinos and warthogs, which blurred the lines of reality even more to make the series more convincing. "It was really nice to have our guys alongside the real thing, they just seemed to fit in," Max adds.

Fitting in

Towards the end of the project, a team of five compositors worked around the clock to complete the series. Using the reference points, trackers and markers that were filmed on location, they composited the beasts into every scene. Working on grading and interaction, they made each beast fit into the environment.

One scene depicted a young Australopithecus hitting the water with a stick. The original footage featured a member of the film crew hitting the water with a flip-flop. Once he had been removed, they could composit the creature into the shot. Most of the work was done using Quantel's high-end, fast editing system, Henry. The tracking work was done in discreet's *flame* and *inferno*.

One of the toughest jobs for a compositor was keeping all sides happy, from animators to directors. Kate Windibank had been working on the series since its beginnings and was happy to see it reach the end. "Making it look good, believable and accurate and keeping everyone happy with the finished effect was the biggest challenge. I think we've done that."

When the compositors got their hands on the material, the rest of the team saw what they'd been working on for 18 months. "Watching it all come together was by far the best bit," says Max. Seeing the fur and the textures being added, getting it back from the compositors, hearing all the sound effects and voiceovers... it just became a lot more real. It comes alive."

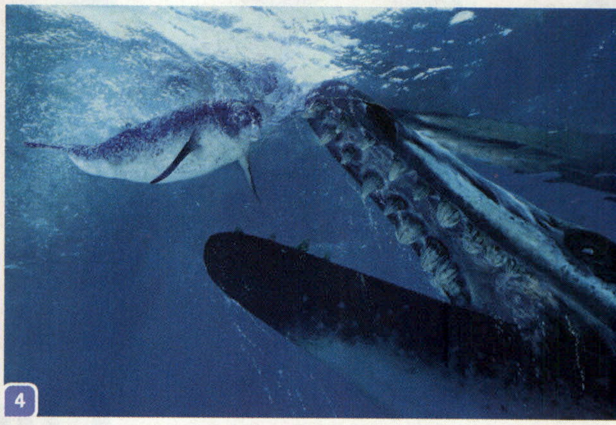
The predicted success of the series is reflected in the amount of coverage bestowed on it by the BBC. Digital satellite, cable and television have extended information about the beasts and the Website is the biggest in the history of BBC Online. Tune in to BBC1 for a mix of science, entertainment and CGI.

Log onto **[w]** www.bbc.co.uk/beasts for more information about the program. See the FrameStore Website for more about its projects, clients and software **[w]** www.framestore.co.uk

2. The texture team added effects such as snow to this herd of mammoths to make the fur even more lifelike.

3. The woolly rhino provided more long fur for the texture artists to cope with.

4. One episode takes place underwater and follows the giant beasts, such as this Basilorsaurus, to the depths.



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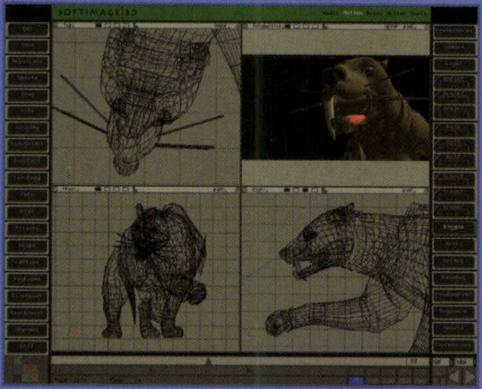
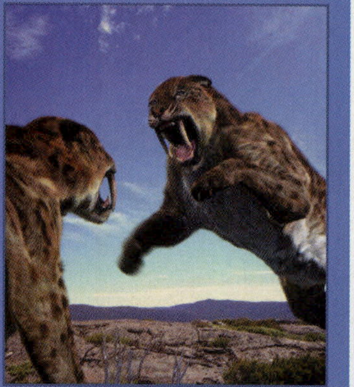
Beasts with bite

The sabre tooth cats get vicious

Every episode featured a fight between one or two species and if the animators were lucky, this would only be a brief scrap. However, one scene required a vicious fight between two sabre tooth cats on a riverbank. "It was incredibly complex, any interaction between two or more beasts takes that little bit more effort," says Max. Watch the sequence closely and you'll see minute attention to detail – snarls, eyebrows and rippling muscles. These effects were so good, the directors decided to feature parts of the animation in slow motion. "The facial expressions were important. We were halfway through when we realised that big cats don't actually blink, they scrunch up their entire face, which was a whole new ball game."

However, Max admits that they may have overdone it when animating packs of the sabre tooth cats. "We built up a massive library of animations: growling, yawning, shaking their heads or going up on hind legs. But when we put them all together, it looked ridiculous. We had to tone it down with a lot of lazy scenes, where they only moved one foot in five minutes..."





A wireframe shot of the working stages of the big cats in the series, and a fully rendered image of the soon to be legendary sabre tooth cat fight. The effects were so good, the directors decided to show parts in slow motion.

Illustration: Rod Steele **[e]** rod_steele@blueyonder.co.uk **[w]** rodsteeledesign.com

Old film effects

Turn your crisp, shiny DV footage into something old, organic and authentic

Watch a few music videos, TV ads or short films and you'll probably see a handful of old film effects. If you're not paying attention, you may believe you're watching genuinely old footage but by the end of this tutorial you'll know how to get that historical look, starting with clean and modern digital video clips.

Many people who use DV try to take away some of the sharpness, to recreate the grainy feel of film. Even though some image quality is lost, this has a more authentic look than the harsh clarity of video. The Old Film technique goes one step further, adding frame jitter, scratches, stains, projector flicker and blurring, to give the viewer the impression that they're looking at old film. The Old Film look is useful for flashbacks and historical representations, but can also be used as a stylish touch or even to represent dreams.

Install the Adobe *After Effects 5* demo before proceeding. If you've never used *After Effects* before, this tutorial should show you the way. First we create a basic simulation of colour 8mm film (the cine-film that might have been in your parent's old cameras). Then you'll gradually make your footage look older and more damaged as the tutorial progresses. By combing these effects at different levels, you should be able to simulate just about any type of film that's ever existed.

Christopher Kenworthy is the author of *The Quality of Light*, and the director of the short film *Pilotage* **[e]** christopher kenworthy@hotmail.com

Tutorial files

Tutorial files are on the cover CD in the Tutorial\Old film folder. There's also an Adobe *After Effects 5* demo on the CD. The full version costs £616.88, upgrade £182.13 available from **[w]** www. adobe.co.uk. If you're using the demo version of *After Effects*, saving is disabled, so when the tutorial recommends exporting and re-importing, simply import the above files from the CD.

Part 1: Basic effects

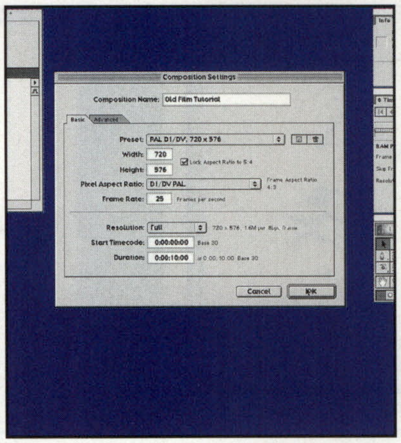
We'll start by giving the film a shaky, handheld look, then apply appropriate colouration and a lower frame rate

CD files

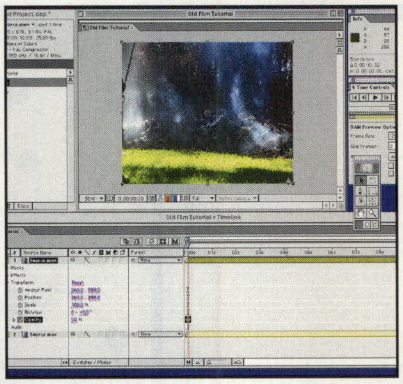
Source.mov: The raw footage for the tutorial.
OldFilm.mov: After the first step, this is what you'll output. Demo users, import this file at Step 2.
8mm.mov: The quick and easy colour version, representing 8mm film.
Final.mov: The end result. Demo users import this for the Projected look section.
Projected.mov: The end result.
Stains.mov: Demo users import this in part 2, step 7.
Hair.mov: Demo users import this at part 2, step 7.
Scratches.mov: Demo users import this at part 2, step 7.
Hairs.jpg: A *Photoshop* file of hairs and micro scratches.
Scratches.jpg: A *Photoshop* file of long, trailing scratches.
Stain.jpg: A *Photoshop* file of print stains.
Frame.jpg: A *Photoshop* file of a movie screen frame.

Less is more

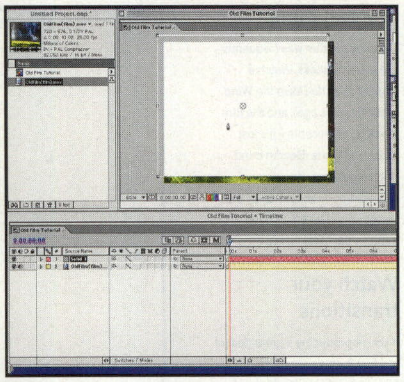
Remember that less is often more. Watch the footage as a viewer; seeing the images, not the scratches, and see how distracted you are. The old feel should be almost entirely subconscious, so if you notice the effect too much, try to tone it down.


Composition Settings
Composition Name: Old Film Tutorial
Preset: PAL D1/DV, 720 x 576
Width: 720
Height: 576
☑ Lock Aspect Ratio to 5:4
Pixel Aspect Ratio: D1/DV PAL
Frame Aspect Ratio 4:3
Frame Rate: 25 Frames per second
Resolution: Full 720 x 576, 1.6M per 8bpc frame
Start Timecode: 0:00:00:00 Base 30
Duration: 0:00:10:00 is 0:00:10:00 Base 30

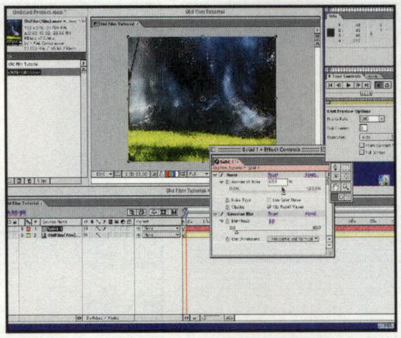
1 Create a New Project, and a New Composition, entitled Old Film Tutorial. Use Preset PAL D1/DV, and a frame rate of 25.



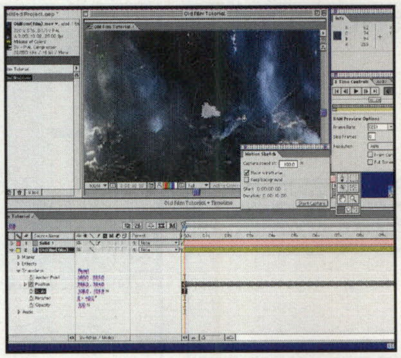
2 Import two copies of your footage file. In the File menu, go to Interpret Footage>Main, selecting Upper Field First for one copy, and Lower Field First for the other. Now drop both pieces of footage in the Timeline. In Transform, set Opacity for the top layer to 50 per cent.



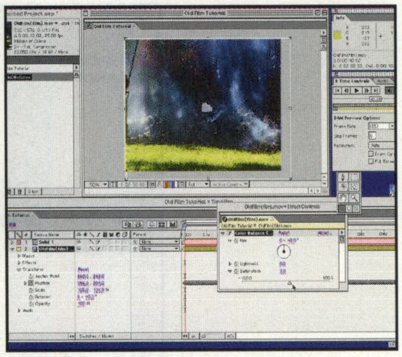
3 Export as a QuickTime movie, (DV PAL, 25 frames per second) named OldFilm.mov. Delete everything from the Timeline. Import this new film-look movie, and drag it to the Timeline. From the Layer menu, create a New Solid, set to white.



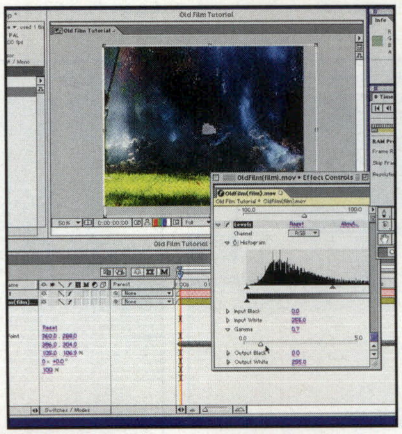
4 Drag the corners of the solid to expand it over the entire film image. In the Layer menu, set the Transfer Mode to Multiply. In Effects, go to Stylize>Noise. Set the Noise at 60, and Blur at 2, turning Colour off. This adds dancing grain to the image.



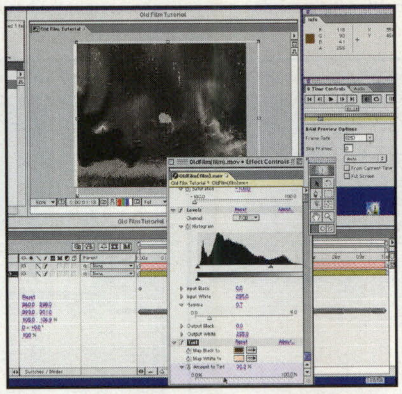
5 For a handheld look, Click the Transform triangle, and type 105 in the Size box. Go to Window>Motion Sketch. Press Start Capture, click on the frame, and begin moving it with a wobble in real-time.



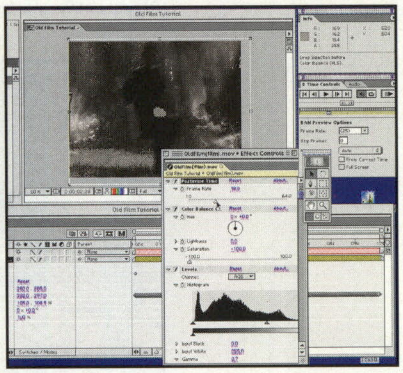
6 For 8mm saturation effects, choose Effects>Image Control>Colour Balance (HSL), and set the Saturation at about +7. Feel free to experiment according to the look of your particular clip.



7 To achieve the contrast and depth of 8mm colour film, go to Effects>Adjust>Levels, and set the Gamma at 0.7 or lower. This clip can now be exported to give a basic 8mm colour film look.



8 To look older, your film should be black and white or tinted. To achieve B&W, simply drag the Saturation as low as it will go. To add a tint, go to Effect>Image Control>Tint. Click the Map To Black box, and set this as a brown or sepia colour. Set tints at about 20 per cent.



9 Film is generally shot at 24 frames per second, but a better effect is achieved with lower numbers. Select Effects>Time>Posterize Time, and set the Frame Rate at 18. In the Effects window, click on the Posterize Time title, and drag it to the top of the Effects Window, so that it's the first filter to affect the footage. ➤

Part 2: Adding damage

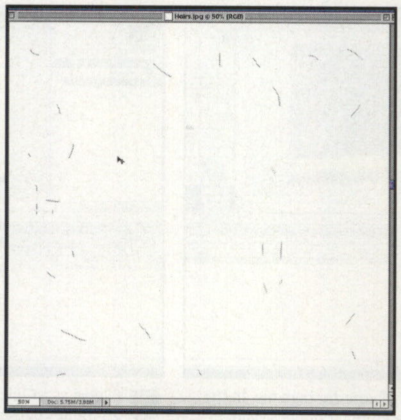
At this stage, we'll apply the pops, scratches and stains that make the footage look like authentically weathered film

The reel thing

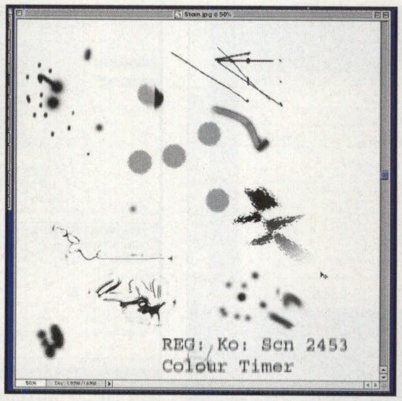
Genuine old film was frequently clear and flawless. Watch a print of *Whistle Down the Wind* (shot 40 years ago), and the film stock is impeccable – it's just black and white. Bear in mind that sometimes, step one followed by desaturation of the image, might be enough to achieve the ideal effect.

Watch your transitions

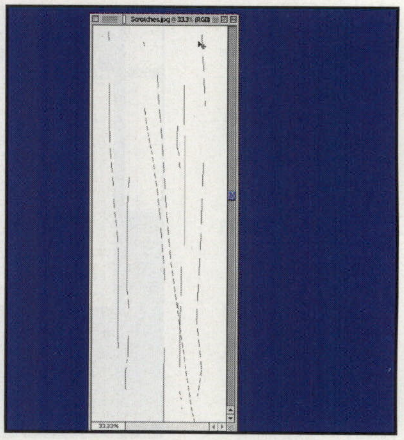
If you're producing a great deal of old film footage, watch your transitions. Avoid dissolves of any kind, because they are a relatively recent invention, and they still looked jumpy right up until the 70s. Instead, apply hard cuts, or multiply a couple of frames where they overlap.



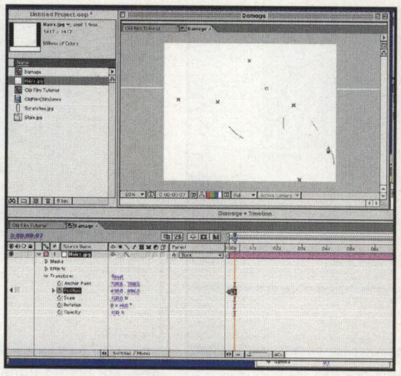
1 In *Photoshop*, create a file of at least 50x50cm, with a white background. Draw small hairs and scratches randomly, and apply Gaussian blur to make them look less distinct.



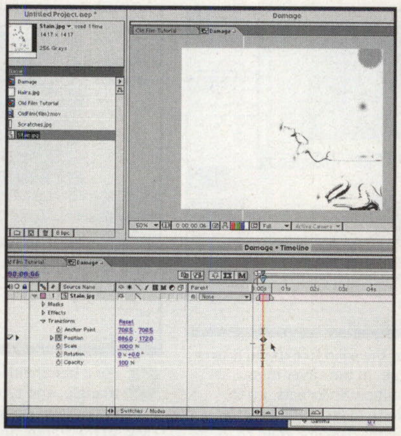
2 Create another file for stains. Draw on blobs, marks, and even text. Apply various filters, such as Chrome or Dark Strokes, to achieve the look of chemical stains and mistakes that could have been transferred to old film.



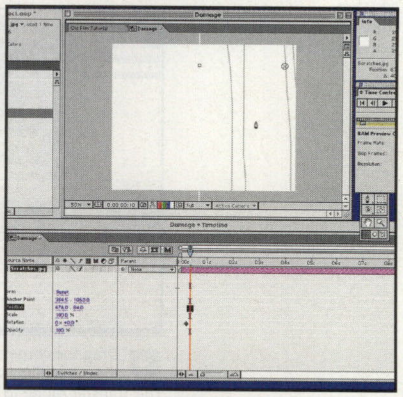
3 Create a *Photoshop* file 75cm tall by 25cm wide, and draw long, straight scratches down the length.



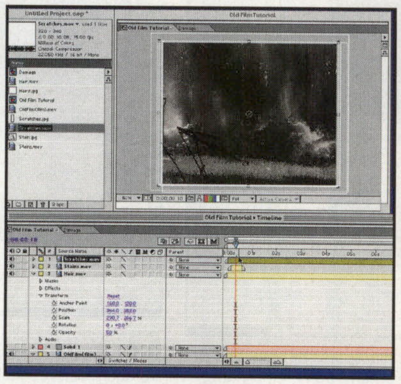
4 In *After Effects*, create a new composition with a white background, and import Hairs.jpg from the cover CD. Go to Expand Transform in the Timeline, and click on the tiny clock next to Position. In Time Controls, click Next Frame. Drag the hairs image to a new location, and advance the frame. Repeat until you've completed the sequence.



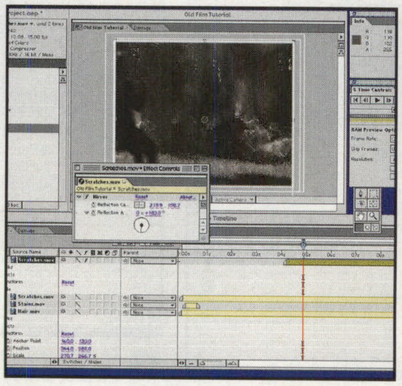
5 Repeat this procedure for Stains.jpg on the CD, but only use a few frames, because stains are much less common on film footage, usually only appearing at the beginning or end.



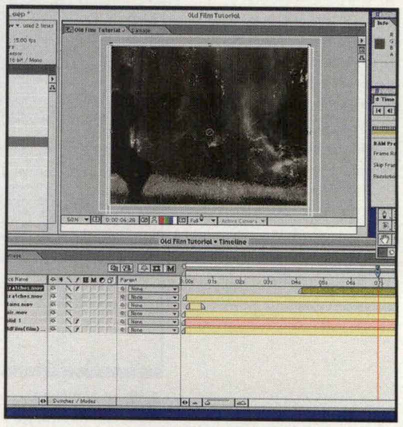
6 Repeat for Scratches.jpg on the CD, dragging the file around, up and down to create the impression of floating scratches. If you want to advance several frames to leave a blank space, drag the scratches image fully away from the frame first. Export these three sequences.



7 In *After Effects*, Import Hair.mov, Stains.mov and Scratches.mov on the CD, and set the Transfer Mode for each to Colour Burn. Place the Stains at the beginning or end of the footage.



8 If you are short of scratch footage, apply effects such as Mirror, or go to Transform>Rotate to create new versions of your old footage.



9 Export the completed footage as Final.mov, and play it back in the *QuickTime Player*.

Part 3: Projected look

To make your film look like it's being screened, it's got to slip, flicker, and even run out of the virtual projector

Blurring the background

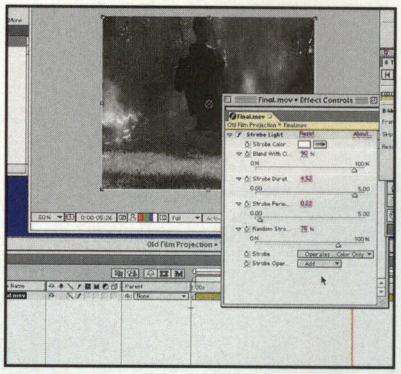
It helps if you shoot a subject that could be plausibly old. Try to shoot with a low depth of field (so open the iris and shoot with a medium to long lens). This helps to blur the background, which was much more noticeable on old film stock and equipment.

LA look

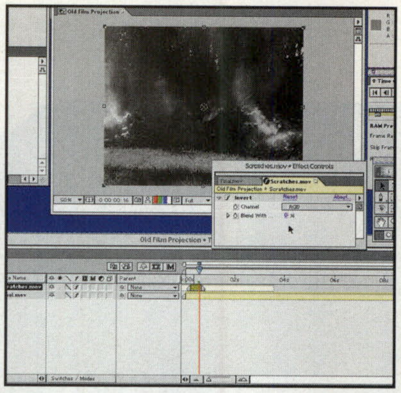
Remember your era: Don't use sepia or black and white if you're simulating the 70s. The 8mm tutorial will show you how to replicate home movies from the 70s, but for a feature-film impression, you may want to desaturate slightly, for that overexposed-LA look that was so common.

Accelerating

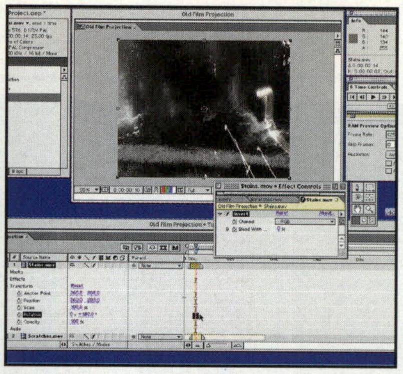
For really, really old film, you can try speeding up the whole clip considerably. Extremely old film tends to look vaguely sped-up. When shooting, of course, remember to keep your shutter speed well below 100, preferably no higher than 60.



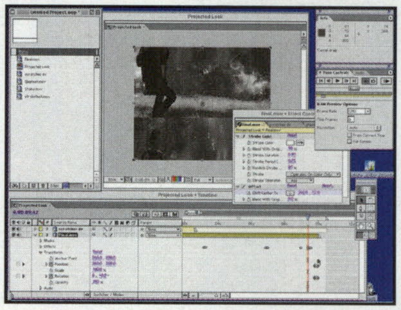
1 Create a New Composition, and Import Final.mov on the CD, dragging it to the Timeline. Apply Effects>Stylize>Strobe Light. Set Blend at 90, Duration at 0.90, Period at 0.23 and Random strobe at 80. Set the Strobe Operator to Add, and your clip will flicker.



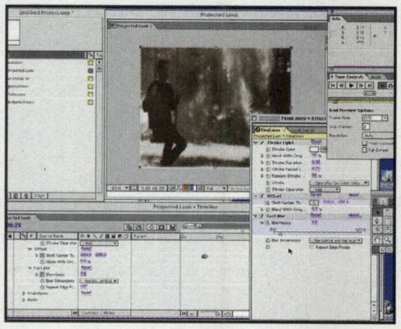
2 Add white negative scratches, by using the same Scratches.mov on the CD, but selecting Effects>Channel>Invert, setting the Transfer Mode to Add. These work best just at the beginning or end.



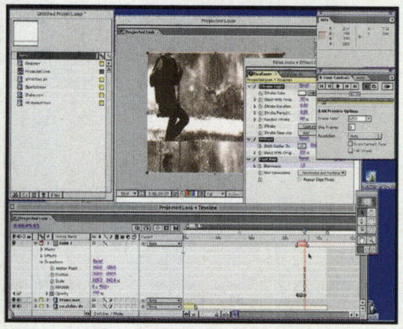
3 Add negative stains at the beginning or end, using the same footage. Drop the Stains.mov into the Timeline, selecting Effects>Channel>Invert. In Transform, set Rotation to 180 degrees. You can also use other effects, such as blurring, to change the appearance of these bright stains.



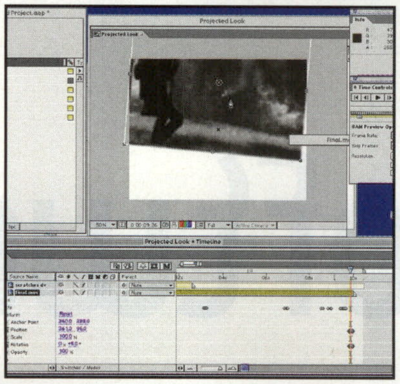
4 For sprocket-slip, select Final.mov on the CD, and choose Effects>Distort>Offset. Set the time marker a few seconds into the clip, Expand the Transform triangle, and click on the tiny clock to set the keyframe. Click Next Frame, click the Offset crosshair, and click halfway up the frame. Repeat a few times, then set the frame back to the centre.



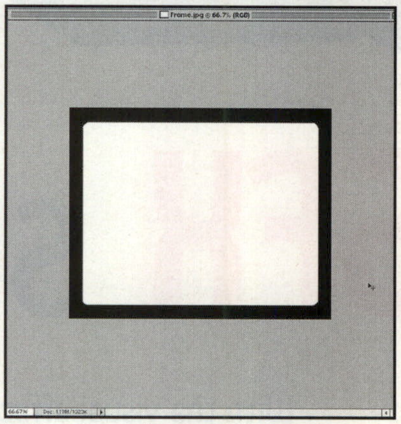
5 To make it look like the image is slipping in and out of focus as the film becomes loose, set the keyframe for Effects>Blur>Fast Blur, close to the end of the clip. Then, every few frames, change the amount of Defocus. You can choose to end the clip completely out of focus.



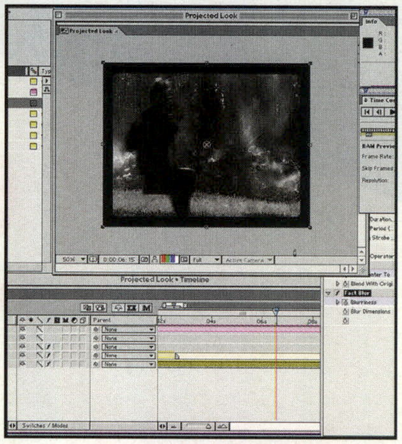
6 To create projector flare (where the film gets too close to the bulb, or too hot), add a New Solid, with Transfer Mode set to Overlay. In Transform, set Opacity to Zero, advance a few frames, set Opacity to 80 per cent, advance a few more frames, and set it back to Zero.



7 To make the film trail off the screen, open the Transform section, and set a new keyframe for Position. Advance a few frames to the end, and click-drag the clip completely out of the frame. Go back a few frames, set a keyframe for Rotation, advance a few frames, and offset the Rotation by 20 degrees.



8 In *Photoshop*, create a white background drawn on some blocks, and use the Lasso tool to remove curved areas at the corners. This creates the basic look of an old cine-screen. Save as Frame.jpg.



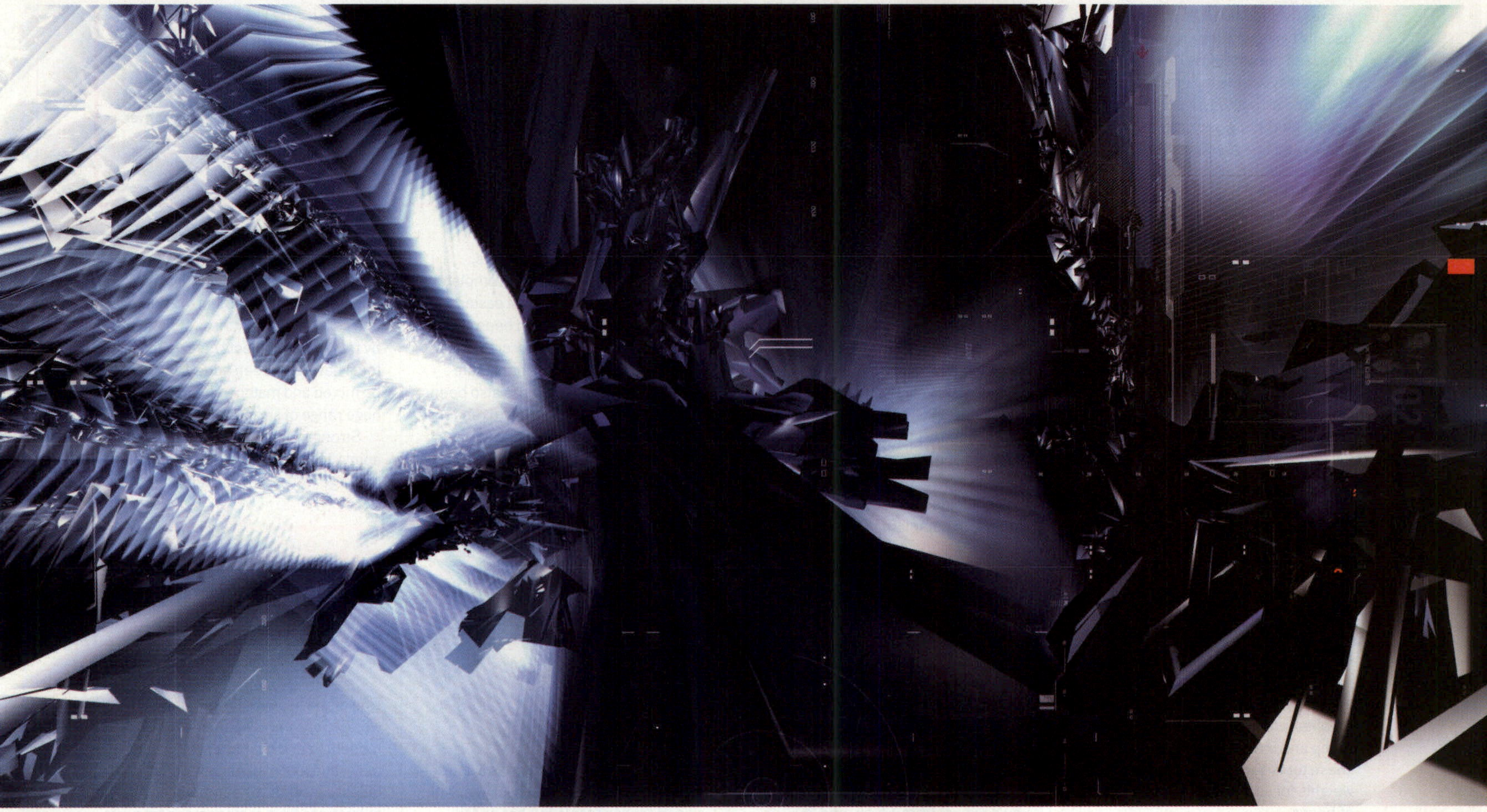
9 In *After Effects*, Import Frame.jpg on the CD, and add it to the Timeline. The Transfer Mode should be set to Multiply. Now export the lot, and the job's done. ca>s

Illustration: shinter **[e]** shinter@mail.com **[w]** www.shinters.homepage.nu

SFX software

With the visual effects arena becoming larger and larger, and more outrageous effects becoming possible every year, we've compiled a guide to some of the most popular and useful effects tools on the market

You'll find demos of *LightWave 7, Cinema 4D V7, After Effects 5* and *combustion* on the cover CD. Expertise provided by Christian Darkin [e] christian@darkin.demon.co.uk



Special effects tools are becoming more and more adventurous, and offering more and more functionality. In addition, they're aimed at a wider and wider marketplace. Techniques which were the preserve of Hollywood a couple of years now appear regularly on the *Teletubbies*, and anyone with a digital camera is looking at how they can out-do *The Matrix*.

One obvious trend is the movement towards joined-up post production. There are dozens and even hundreds of effects packages and tools around, so making them all talk to each other is pretty essential. Right now, compositors are getting very good at this. The *After Effects* plug-in format is becoming ubiquitous, and so it's now possible to buy a single plug-in which works with several effects packages (However, the integration isn't complete, and you'll need to check before buying that your particular package supports the plug-in you're buying).

In addition, the flow of information between 2D and 3D programs is increasing. You can now render out *3ds max* animations with significant data designed to be interpreted by *combustion*. Likewise, you can send camera motion data from *Digital Fusion* to *Maya* and back.

The communication between 3D packages, however, is still very poor. Perhaps the competition in the marketplace is too tough for the vendors to co-operate, or perhaps the complexity of the data that needs to be sent to make scenes operate smoothly between applications is too great.

With the visual effects arena becoming larger and larger, and more outrageous effects becoming possible every year, we've gathered a selection of the most popular and useful effects tools on the market.

Some are mainstays, appearing in their seventh or eighth generation. Others are tools for very specific jobs and reflect the latest fashions in special effects. And while some may be out of fashion again in a couple of years, or when new technologies overtake them, others, like the new real-world physics and character animation tools, show us the route effects technology is likely to take in the future. ➤

LightWave 7

Price £1495
System PC and Mac
[w] www.newtek-europe.com

LightWave has been well established for years as one of the most popular packages for 3D design and animation. In one form or another, it finds its way into many films and TV series and its aggressive update policy (there are usually two upgrades per year, one paid, and the other free) means that it always stays at the forefront of available technology. It's well known as a good modelling package, and its smoke and fire generation are second to none.

LightWave 7 boasts simple fur and particle dynamics as standard, as well as a new non-linear editor for quickly merging sections of animation together into complex scenes.

Maya 4

Price £6360 (Maya complete) or £13,560 (Maya Unlimited)
System PC and Mac
[w] www.aw.sgi.com

Maya is a real heavyweight in the 3D world, both in terms of features, and price. Strong modelling tools, with good Subdivision Surface and NURBS options, combined with excellent IK, and character animation tools, and a non-linear editor for combining animations.

3D painting is a strong feature, with an increasing range of available brushes, and tools for creating image, bump and other types of textures. These tools can also be used to paint weights for such things as the influence of bones.

Various versions of *Maya* are available with different levels of features, and the accessibility and power of the program's internal scripting language ensures that there are plenty of plug-ins around to extend the package.

Movie3D

Price approx £150 (excl VAT)
System PC
[w] www.aist.com

A low cost 3D package, but a quite extensive one. An only slightly cut-down version of *Realsoft 3D*, this package has a surprisingly advanced feature set.

Metaballs and NURBS surfaces are supported for the modelling of complex and organic curves. Basic physics are included in the package including gravity and collision detection. Very limited fur can be created, and animation can be choreographed using a pretty decent IK and animation system.

Movie3D has been tweaked to connect especially well with the *MoviePack* range of video editing software. This means you can do 2D and 3D compositing combining various packages very efficiently.

Some of *Movie3D*'s headline features aren't quite as developed as they could be, but at this price, it's difficult to complain.

3ds max 4

Price £2695. Upgrade from Max 3: £595
System PC
[w] www.discreet.com

3ds max is one of the mainstays of 3D animation. It's a well-rounded package containing all the features you'd expect from a high-end 3D package. Patch, Subdivision and NURBS modelling are well handled and fast to use. Rendering is also very quick, but lacks radiosity and caustics.

Video painting vs compositing

Compositing packages treat the video clip as a whole. You can add effects to it, alter it over a number of frames, or even create stills, but the tools are designed to deal with video frames in bulk.

In contrast, video painting, or rotoscoping, is about manipulating video frames as though they are still images. With a rotoscoping package, you can paint onto individual frames or groups of frames with realistic natural painting tools, and step back and forth through your sequence at will. Essentially, you behave like a traditional cell animator. This means that video painting tasks are often time-consuming and repetitive.

However, you have absolute control over everything that happens on every frame of your shot. With a decent video painting package, you can draw objects into a scene over a period of time, remove wires from stunt shots, or logos from buildings, or even paint muzzle flare onto a gun.

Release 4 contains a lot of new features for character animators. The bones system has been completely re-worked, making life a lot easier, Parameter Wiring has also been introduced so you can now create custom controls for any animatable parameter. Compositing has also been made easier with the option to render certain aspects of your scene as separate images. For example, if you render the shine of your scene as well as its image, you'll be able to overlay them and dynamically adjust its strength during the composite.

Cinema 4D XL 7

Price £1395
Company Maxon
System PC
[w] www.cinema4d.com

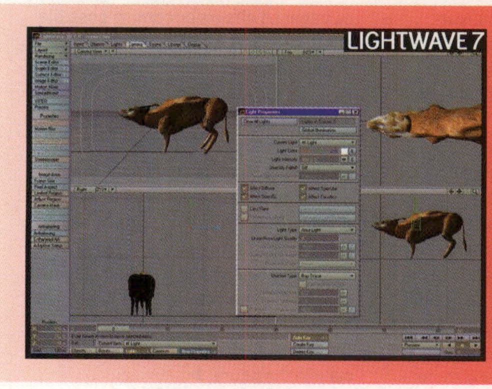
Cinema 4D is evolving fast. It's a solid modelling and animation package, with a good range of tools but has so far failed to gain the profile of packages like *3ds max* and *LightWave*. It's a strong tool for effects, with good quality rendering which doesn't sacrifice speed too much. The render engine now features advanced anti-aliasing set-ups, radiosity (the effect of light bouncing from one object to another) and caustics (the patterns of light cast by transparent objects). New shader tools have also been added which can be mixed and matched to produce a huge range of surfaces and materials.

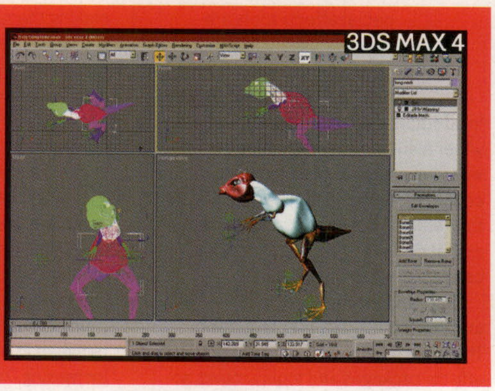
Strong modelling tools and plenty of animation possibilities make this a package well worth considering.

Softimage|XSI 2

Price: Essentials £5,500, Advanced £8,200 (excl VAT)
System PC
[w] www.softimage.com

One of the heavyweights of the 3D world, *Softimage* features good modelling and character animation tools, and a non-linear editor for quickly assembling complex animations from their component parts. Simulation tools are extensive, with rigid and soft body dynamics well implemented. In addition, cloth and hair can be simulated and animated, as





can the motion of liquid. Version 2 includes a new text creation tool, enhancements to texture and material tools, and a handy built-in compositor which enables you to combine 2D and 3D elements and add effects. In addition, there's a new built-in software development kit so you can write your own plug-ins.

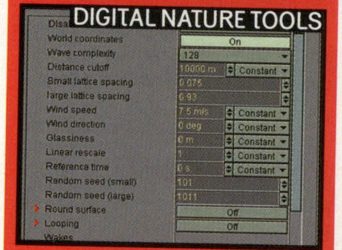
character studio 3

Price £995
System PC
[w] www.discreet.com

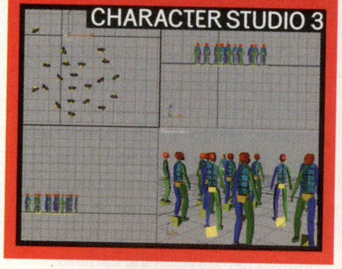
Probably the most important *3ds max* plug-in on the market for character animators. *character studio* enables you to skin and animate bipeds using a series of simple tools. Characters can be made to walk and run by simply placing footsteps into a scene. Other motions can be imported with motion capture software, and quickly blended with a non-linear editor into complex sequences.

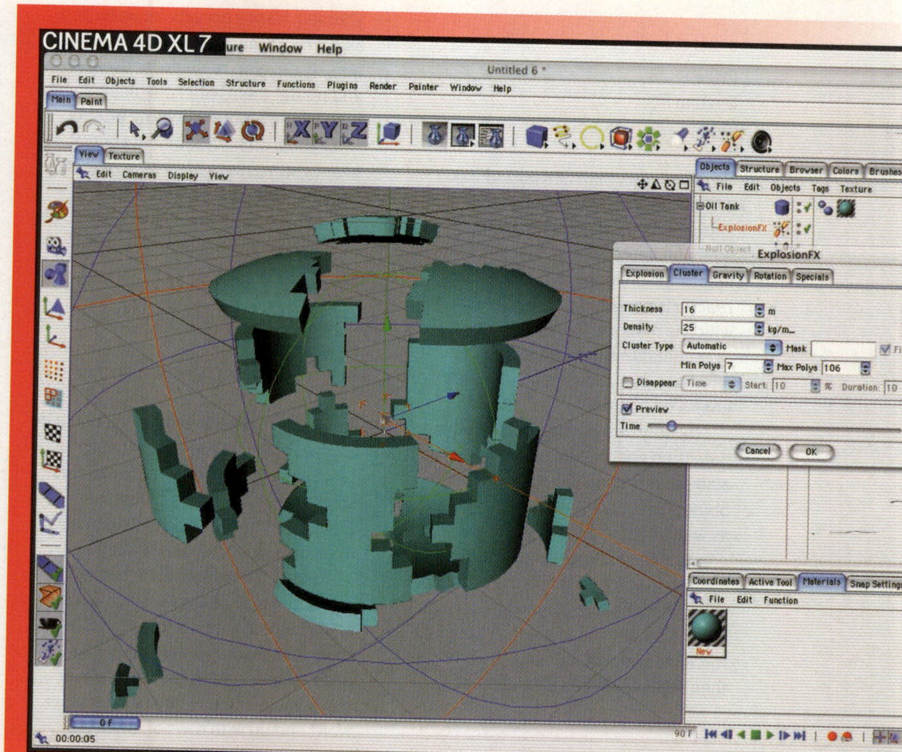
In its latest version, *character studio* includes the ability to create crowds. You can simply set up starting positions and animation sequences for any number of creatures, then tell them to follow or avoid other objects, or each other. Each member of the crowd will then be given their own unique motion path, with animation loops synchronised automatically so that however many characters you have, they never walk into each other.

SOFTIMAGE|XSI 2


DIGITAL NATURE TOOLS

World coordinates: On
Wave complexity: 128
Distance cutoff: 10000 m, Constant
Small lattice spacing: 0.075
large lattice spacing: 0.93
Wind speed: 7.5 m/s, Constant
Wind direction: 0 deg, Constant
Glassiness: 0 m, Constant
Linear rescale: 1, Constant
Reference time: 0 s, Constant
Random seed (small): 101
Random seed (large): 1011
Round surface: Off
Looping: Off


CHARACTER STUDIO 3


CINEMA 4D XL 7

ExplosionFX
Thickness: 16 m
Density: 25 kg/m_
Cluster Type: Automatic
Min Polys: 7
Max Polys: 106
☐ Disappear: Time, Start: 10 %, Duration: 10
☑ Preview

3D tools

There are a vast range of 3D tools available, and each has its own strengths and weaknesses. In addition to the main tools for animation and modelling (*LightWave*, *3ds max*, *Maya*, and so on), there are also standalone packages which aim to do certain very specific 3D tasks. Landscape designers, 3D motion trackers, and photo-modellers all work independently, but provide files that can be brought into your 3D package.

The main 3D tools themselves, offer the ability to create, animate and render 3D objects and scenes. Most have basic compositing tools, but can't replace a really good compositing package. Each 3D program also has dozens of plug-ins, some of which are covered here, which offer extra functions such as hair rendering, fire and smoke effects and real-world physics.

Sasquatch 1.5

Price $499
System PC, Mac
[w] www.worley.com

Hair has traditionally been a very tricky thing to master in 3D animation. The main 3D packages all have plug-ins for hair generation. The lite version of *Sasquatch* has been included with *LightWave* (see tutorial on page 52). However, you can make much more sophisticated animated hair with the full version.

Hair can be graded to change colour over its length, and can be combed using guides (splines along which the hair will grow). This enables you to produce complex hairstyles, and by animating the guides, you can make the hair with any of *LightWave*'s other animation tools.

In addition, you can use *Sasquatch*'s dynamics to make the hair move automatically, a method which doesn't require pre-computation, unlike in most other hair packages.

ProOpticSuite

Price $595
System PC
[w] www.digimation.com

3ds max's fire, smoke, and lens effects tools aren't that strong. *Pyrocluster* is an add-on designed to make them a whole lot more effective. The collection consists of three plug-ins:

Pyrocluster uses *max*'s own Particle Systems as a starting point, and enables you to create some very realistic 3D combustion effects. There are presets for everything from fluffy clouds, to fireballs, to volcanic smoke.

LumaObject enables you turn any object into a light source which means you can fake radiosity, and create real lighting set-ups for your scenes.

RealLensFlare offers an infinitely customisable selection of lens flares. With it you can produce all the normal realistic-looking flares, but also a whole range of stargates, vortices, galaxy clouds and explosive lighting effects, some of which can be stunning.

Digital Nature Tools

Price $495
System PC
[w] www.digimation.com

Available for *max*, *Maya* and *LightWave*, this plug-in creates realistic skies, clouds and water effects. It's been used in several films, including *Titanic*. *Digital Nature Tools* consists of three separate plug-ins:

Air uses the lighting already present in the scene to create a shaded atmosphere, and enables you to add haze and fog effects as well as rainbows. The effect can be set very simply for quick results, but you can also go in and alter the sky in subtle ways using more sophisticated settings.

Cloud produces realistic volumetric 3D clouds from any object. You can (at a cost in terms of render time) animate them, but they're primarily intended as a static effect.

Water makes large and small bodies of water which can be made to move very realistically. When you add *Water*'s various specialist material presets, the results can be very convincing. ➤

reactor

Price £875
System PC
[w] www.discreet.com

Physics is an important part of 3D animation. It lets you automate animations, applying gravity, and collision detection to objects as well as creating more complex simulations. *reactor* is powered by the Havok engine which is responsible for the impressive 3D simulations created in *Director 8.5*. However, as a *3ds max* plug-in, *reactor* goes a lot further.

Not only does it handle 3D collision detection and motion of solid objects, it also provides calculation for soft objects like cloth, and wobbling flesh, as well as basic fluid dynamics for creating waves, and wakes in liquids.

With it, you can set up the physics of a 3D world, so that all you need to do when animating is to provide the initial forces to set your animation in motion, then sit back and watch the results.

Bryce 5

Price £229
System PC, Mac
[w] www.corel.com

Bryce is first and foremost a landscape creation package, but each release seems to make it into a more and more rounded 3D application. With it you can make impressive and authentic landscapes featuring water, trees, and clouds. It's fast and easy to set up.

You have complete control over your landscapes, lighting and texturing, but you don't have to model every polygon yourself. Handy presets for water, fog, skies, rocks, and terrains enable you to quickly develop realistic landscapes, and render them with convincing depth of field and ambient lighting effects.

Bryce 5 offers additional control over lighting, more presets, a new Tree Lab, and Network rendering.

Vue d' Esprit 4

Price £169
System PC
[w] www.e-onsoftware.com

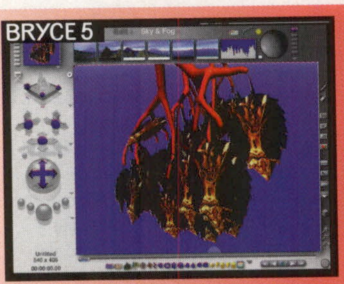
As an alternative to *Bryce*, you could do a lot worse than *Vue d'Esprit*. It's a landscape generator which produces startling results. It's cheaper than *Bryce*, and a little trickier to use, but does include some neat features.

Its Vegetation Generator is one important tool. There's a range of types of shrubs and trees, and you can configure them. However, they're all procedurally generated, so however many you place into your scene, you won't end up with rows of identical plants. Each creation will be different.

Poser 4

Price £175
System PC, Mac
[w] www.curiouslabs.com

If you're doing character animation, *Poser* enables you to quickly pose and animate a range of human and animal models. Around 60 characters are included in the package along with various types of clothes which can be snapped onto your models.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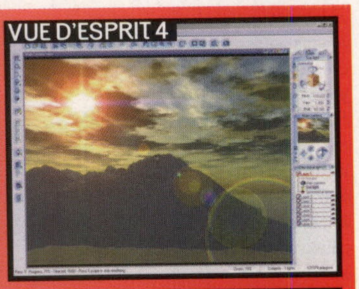
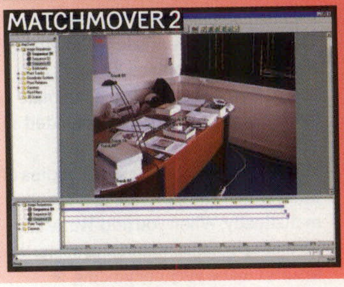
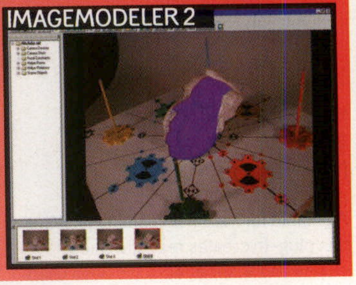

VUE D'ESPRIT 4


MATCHMOVER 2


IMAGEMODELER 2

Facial animation morphs and hand gestures are included too so that your characters can be brought to life quickly and simply using a well-thought out interface.

In addition, motion capture files are provided which offer a range of pre-programmed motions. You can now bring your own models into *Poser*, and quickly make them into poseable figures.

The *Poser Pro Pack* is also available to work with *LightWave*, *max* and *Cinema 4D XL*, and has *Flash* export.

Matchmover 2

Price £3252
System PC
[w] www.realviz.com

It's generally tricky and very expensive in 3D to match real-world moving camera footage with computer generated effects. In 2D, it's relatively simple: many packages like *After Effects* and *combustion* enable you to track the motion of a point on a video scene, and map that motion onto another video layer. If the camera moves forward or back, or if it moves around an object, you'll need a program like *Matchmover*.

Matchmover enables you set up several tracking points, and follows them throughout the length of your shot. From the relative motions of these points, the utility figures out the 3D dimensions of your scene, and the camera's parameters and motion within it. It then produces a virtual camera which can be loaded into your 3D application. When you render the CG elements of your shot, they should fit right into your video and appear with correct motion and perspective relative to it.

ImageModeler 2

Price £3125
System PC
[w] www.realviz.com

ImageModeler creates 3D objects from photographs of real world scenes. The idea is that you take several photographs of the object you're modelling, load them into the package, then model the object by creating points which you move and place on every photograph.

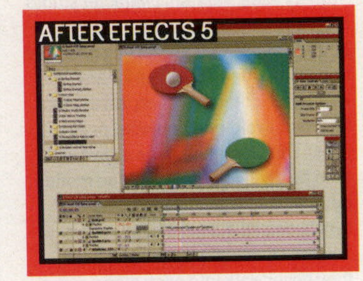
Once you've done this, the software works out the shape of your object, and enables you to steal the textures from your images which it automatically distorts into flat image maps, and wraps onto your 3D object.

The process is time consuming, especially for complex objects because you have to place each point individually several times. However, it's a lot less expensive and portable than other methods of 3D capture.

After Effects 5.5

Price £617, Production Bundle £1439
System Mac, PC
[w] www.adobe.com

After Effects is probably the must-have package for general compositing and effects. It covers a lot of ground, and can be extended with third-party plug-ins. Compositing tools include animated masks (which have been improved for version 5.5) filters and effects, colour correction tools, and various types of keying. Particle effects with basic physics and text animation are also included. You can place layers in 3D space, and add and animate cameras and lights. This makes convincing 3D compositing a lot easier.


AFTER EFFECTS 5

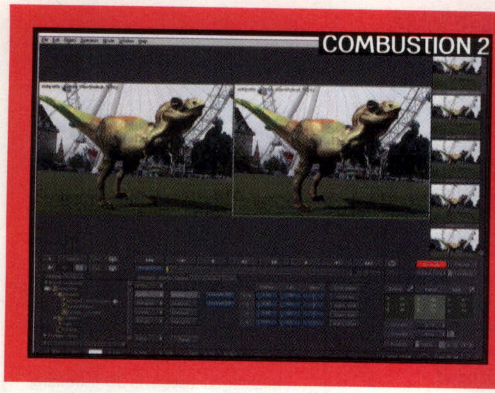
Version 5.5 enables 3D layers to cast coloured shadows and act as projectors, and enables you to view the results from several viewpoints at once. New effects are also provided, including an exposure stabiliser which can counter the effects of changing brightness during a shot (like the sun going behind a cloud, for example).

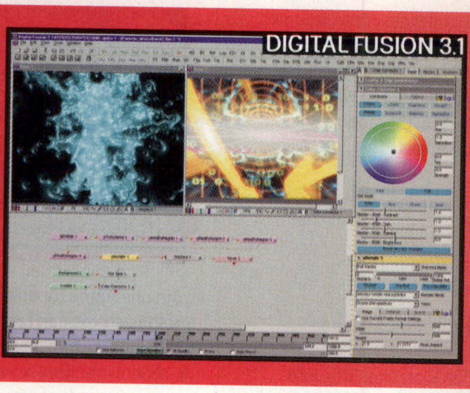
The more expensive *Production Bundle* also includes motion tracking and basic video painting – see the review in issue 66 of *Computer Arts*, on sale December 18.

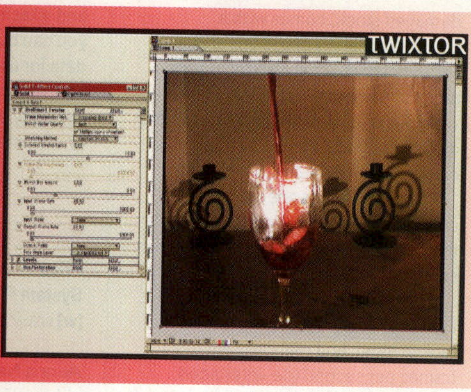
Commotion 4 Pro

Price £1864
System PC, Mac
[t] 020 8358 5857

Commotion used to be a video painting package with a sideline in compositing. Nowadays, it's a strong competitor for *After Effects*. Semi-automatic colour







matching will be a help to anyone trying to blend CG and real-world footage, and very well put together Particle Systems create instant (if not completely convincing) smoke and fire effects. The keying and matting functions of *Commotion* are superb with the *Primatte Keyer* (one of the best keyers we've seen) being included in the package.

Commotion's video painting and rotoscoping tools, however, remain one of its strongest points with a good range of real, and surreal brushes, and the ability to clone parts of an image over a range of frames.

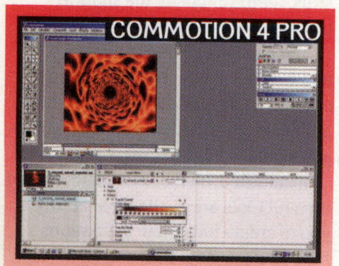
Like *After Effects*, there's a Standard and a Pro version of the software – with the Pro version featuring more effects filters, and motion tracking tools.

combustion 2

Price £TBA
System PC, Mac
[w] www.discreet.com

Discreet's entry into the desktop compositing market is the impressive *combustion*. *combustion* combines a well-laid out interface with some very useful masking and keying tools, good motion tracking functions, and a very effective set of colour correction tools.

The fact that much of the package has been borrowed from the (very) upmarket *flame* system has meant that not only are the tools top notch, but also that users can switch from one system to the other very easily. *3ds max 4* compatibility is very strong, so *combustion* becomes an even more powerful tool when used in conjunction with *max*. Version 2 is out soon.



Digital Fusion 3.1

Price $4995
System PC
[w] www.eyeonline.com

Not one of the best known compositors, but one which is powerful and well laid out. The interface is very uncluttered, and makes good use of the flowchart display to simplify the creation of complex hierarchies of effects.

Rotosplines, and keying are both very well implemented in *Digital Fusion*, so you should be able to separate the elements of a shot reasonably well, even with tricky projects. Video painting is basic, but it's there, and 2D motion tracking is in place too along with a new colour correction tool.

Text effects are a particular strength of the package with almost instant set-up of effects like write-on, path follow, glow and shadow effects. In addition, much more complex text effects can be added with a little more effort, producing warping, swirling, and 3D text.

flame

Price £220,000
System IRIX
[w] www.discreet.com

flame is Discreet's industry standard high-end compositor. Its clean, modular interface has a lot in common with that of the cheaper *combustion*.

However, it includes the full range of post production compositing tools and effects which can be added quickly and keyframed very finely. *flame* gives you incredibly strong keying and matting tools, along with colour correction and grain adding and subtracting functions. Together, these let you remove or add objects from one scene into another seamlessly, creating multi-layered composites.

3D is another of *flame*'s important areas – with strong integration with *3ds max*, and the ability to exchange 3D camera data, models, textures and so on between packages.

Twixtor

Price $325
System PC, Mac
[w] www.revisionfx.com

When you slow down a piece of video footage, you're effectively increasing the amount of information you need to display to produce a smooth shot.

If you've got a scene shot at 24 frames per second, and you slow it down to a quarter of its original speed, you're effectively showing just six frames per second. The result is a very jerky image.

Twixtor solves the problem by using a kind of morphing, to create intermediate frames, and produce a smooth, graceful motion. Likewise, when speeding up a scene, *Twixtor* can create appropriate shots to combine frames and create a more realistic effect.

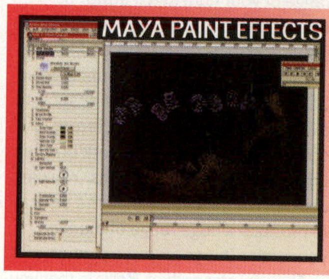
Twixtor comes as an *After Effects* style add-on which means it should work on compatible packages like *Premiere, combustion, Commotion,* and *Final Cut Pro.*

Maya Paint Effects

Price: $499
System PC, Mac
[w] store.toolfarm.com/painteffects

Maya Paint Effects is an *After Effects* plug-in which enables you to paint onto video frames using animated effects brushes. Each paint stroke is a curve which can be drawn onto the frame, then edited later. Paint effects, of which there are about 140, include various settings and animated properties.

Simple brushes and airbrushes are covered, as are more interesting effects like lightening, water, popcorn, trees, flowers, smoke and bubbles. For each brush, you can alter effects such as wind (making grass sway from side to side), gravity (making it droop), or lighting. Some of the brushes are superb and, although they at first appear to be quite limiting (a hyacinth is a very specific flower, and not much use if you want a tulip), they can be blended and altered in some quite interesting and unexpected ways.



Rendering these effects takes time – often several minutes per frame on a reasonably respectable computer. However, the results are sophisticated and effective.

Cinelook

Price $695
System PC, Mac
[w] www.digieffects.com/

If you want to make your video shoots look like film, then *Cinelook* is probably the most flexible and convincing way to do it.

This set of two *After Effects* plug-ins (one for creating the grain and look of film, the other for simulating ➤

damaged stock) comes with a bewildering array of options and settings. However, it also includes a range of presets which let you fake various makes and grades of film, from dirty 8mm black and white through to cinema quality 35mm.

Damage presets enable you to create anything from unaffected stock through to old, decayed film covered in scratches and stains.

To be really effective, you need to light your video shoots with the film look in mind, and reduce them to 24 frames per second (de-interlaced). However, with good raw footage to work from, you can expect to convince anyone but a cinematographer.

Boris FX 6

Price $649
System PC, Mac
[w] www.borisfx.com

Boris Effects is an add-on to *Premiere, Media Studio, After Effects, Speed Razor, Final Cut Pro* and a range of other packages. It vastly extends the range of your non-linear editor or effects package, adding effects filters, particle effects, and advanced keying.

With it, you can quickly add 2D and 3D Particle effects like rain or snow to a scene, choose from 27 different compositing modes, and work on your image with (limited) 3D tools. You can also keyframe and layer all the effects to produce a huge range of them on your entire image, or just a portion of it.

The real strength of *Boris* is that you can use it within your editing package so you don't need to keep exporting sequences to a separate compositor to do your effects work, everything takes place on the timeline.

Hash Animation Master

Price £299
System PC, Mac
[w] www.hash.com

Hash Animation Master is a standalone 3D animation app designed for creating and animating characters. Its low cost and simple interface belies a strong feature set.

Good modelling and texturing tools for complex characters combine with physically dynamic fur and hair to produce effective-looking characters. However, it's when you start to animate that the package really comes into its own. You can define complex motions so they can be re-used over and over, and attached to simple controls, and you can build up libraries of animation data for use on new characters.

These can be rendered with full radiosity, anti-aliasing, and environmental effects.

Aura 2

Price £704
System PC
[w] www.newtek-europe.com

Aura is NewTek's compositing and video painting package. It enables you to treat video in much the same way as *Photoshop* treats still images. You can paint onto any individual frame of video using a good range of natural media tools.

Painting strokes can be recorded and played back over time, creating write-on effects for painting and text. Filters are also provided, and *Photoshop* add-ons can be brought into the package too, and applied either to one frame at a time, or to a range of frames. Rather neatly, *Aura* manages to render your video work as you do it, so even with complex effects, you can watch the results of your changes as soon as you've made them. Your video is played back in real-time.

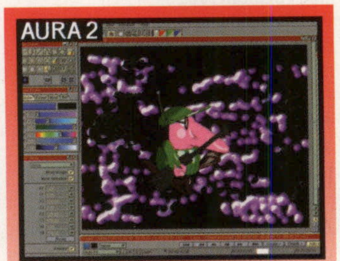
Media Studio Pro 6

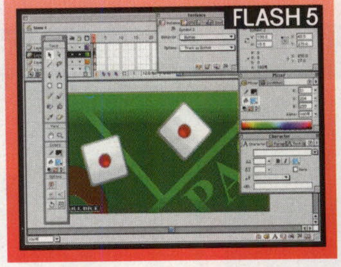
Price £399
System PC
[w] www.onevideo.net

Media Studio is basically an all-round post production suite. Its editor is pretty strong, but its potential for effects work comes from the *Video Painting* program included in the package.

Video Paint lets you load in video files, and alter them in a huge number of different ways. You can paint directly onto each frame of video, or animate your painting over a number of frames.

The package is ideal for effects which need to be animated frame by frame, like lightning, laser bolts, or write-on effects. It's also very good for cloning objects or parts of the screen from one frame (or one video clip) to another, so you can replace a person's head, paint out an unwanted object, or do motion tracking work by hand.





Flash 5

Price £259
System PC, Mac
[w] www.macromedia.com

Not traditionally thought of as a video effects package, *Flash* was created for Web design. However, with the ability to export video files, and a lot of strong text and 2D animation tools, it's being used a lot in the design of animated graphics and logos.

You can very easily produce simple animations, and if you need a greater degree of control, it's always available. *Flash* is especially good with text animation, and includes a number of features for embelishing and animating text.

Flash animations are by definition graphical rather than realistic, but with more and more videomakers and companies wanting to transfer their animations back and forth between video and Web media, it's well worth considering as a post production tool.

Photoshop 6

Price £469
System PC, Mac
[w] www.adobe.com

A good still image package is invaluable in effects work. *Photoshop* can't load in video files, so you need to export any clips to the package as sequences of still images.

The package can, however import Filmstrip files which you can export from *Premiere* or *After Effects*, so you can work on short clips. In addition, it's said that Adobe is planning to add video input to the package in the near future, so *Photoshop* is set to become a much more powerful video effects tool. *Photoshop* is very useful for creating masks and mattes, and designing still images for animation in compositors like *After Effects*. Your *Photoshop* layers can be preserved in *After Effects*, so it's often a lot easier to pre-compose your animated stills effects on *Photoshop* layers before moving to the compositing stage.

Compositors

A compositor is a package such as *After Effects, Combustion, commotion* and *flame* which enables you to import, isolate and combine elements from several video shots into a single frame. They all contain masking and keying tools, enabling you to integrate still and moving images. Many now enable you to work in 3D – treating each image as a flat screen which can be arranged in space, and shot, animated and lit just like a 3D scene. Some also offer motion tracking so you can trace the 2D motion of an object within a scene, or of the camera.

Each compositor offers a range of effects filters which can be applied to your shot, or elements of it, and animated using keyframes. You can usually expand the range of the filters with third-party plug-ins of which we've covered a representative range here.

CTP 1.2

Price £2200
System PC, Mac
[w] www.cratersoftware.com

CTP is a 2D animation package designed primarily for cartoon artists. It contains a range of features to take your artwork from the drawn image, through to output as a finished animation.

You can capture from a video source, or create animations from scanned stills, then composite the shots to produce complex scenes.

You can have up to 200 layers of audio and visual images at a time, and use cameras (which can also be animated) to set up your shots much as you would in a 3D package.

In addition, all the usual painting and area fill tools are available enabling you to create full colour animations from line drawing. ca-s

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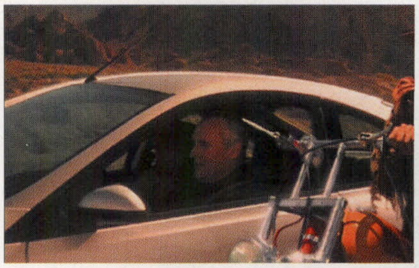
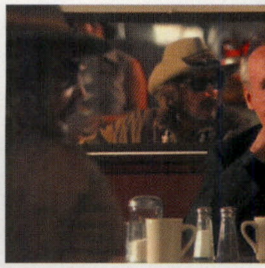
NewTek Alias|wavefront PINNACLE SYSTEMS hp invent MAXON matrox Digital Video Solutions SONIC FOUNDRY Ulead Systems ELSA

1. The promo for Faithless' *Muhammed Ali* was graded in telecine to achieve the washed-out, grittier look of a 1970s-era film

2. Rushes 3D animator, John Paul Harney, created the ident for the company's Soho Shorts Film Festival using *Softimage|XSI* (see boxout, page 37).





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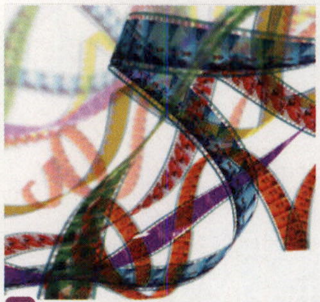

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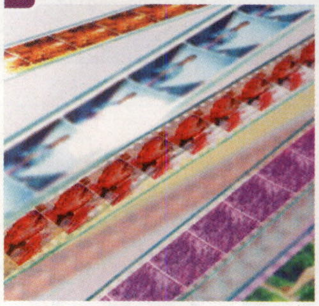


Rushes

"We want to give the best creative opportunities and combine all our different strengths into providing the best solution," *says Rushes creative director, Mike Uden*

The folks at Rushes are crazy about colour. Their passion for all hues of the rainbow is reflected in their guest reception area. Fat red, green, and blue crayons are lounging lazily in a jar. Two triangular glass coffee tables nestle into a deep orange carpet. Yellow, red, and orange edibles rise up from the fruit bowls. And then, a few steps from this comfortable explosion of colour, are the Rushes telecine suites. This is where Rushes gets serious about colour.

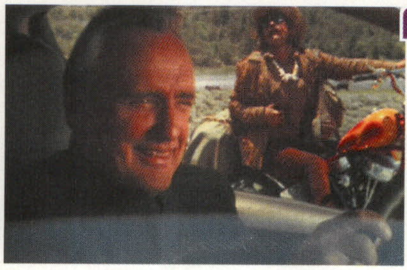
Rushes is one of the top post-production companies in the UK and Europe. Over a couple of decades, the company has built a portfolio of groundbreaking creative turns. It was Rushes that created effects for Dire Straits' *Money For Nothing* video back in the 1980s and Steve McQueen may not have been nipping around the streets of San Francisco in a Ford Puma, if the Rushes operators hadn't got their mitts on him.

More jaw-dropping credentials dangle from the walls of the Rushes offices. On the way to learning about telecine, we spy an old man's head grafted onto the body of a tortoise – it's the CD cover for The Avalanche's single *Frontier Psychiatrist*. Rushes has done a lot of pop promo work: for Embrace, Depeche Mode, Super Furry Animals, Faithless, among others.

But at the moment the company is particularly proud of its telecine work. They've just added new services that offer more socket-busting processing power and a greater range of effects than ever before.

"The telecine stage is where the director, director of photography, and cameraman are all involved together," explains Paul Jones, the all-knowing Facilities Director at Rushes who has been with the company since the analogue days when film was spooled and spliced. "This is where it gets most creative for them."

Telecine is, at its most simple, the process of scanning film and transferring it to tape. The film, in digital format these days, is then graded, effects are added, and then edited. The grading, or colouring, is carried out in telecine using one of three powerful ➤

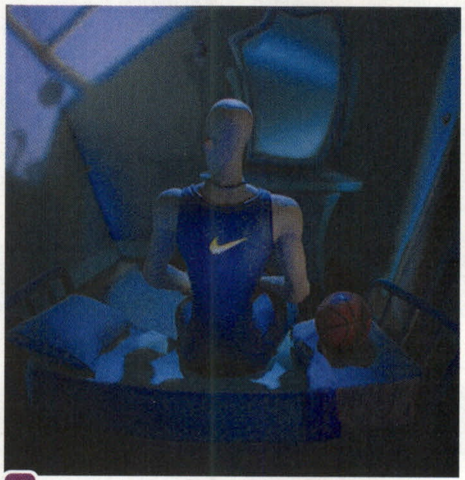


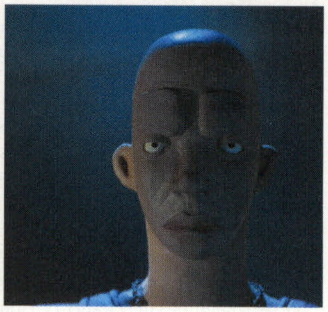
Film festival

Every year, Rushes hosts the Soho Short Festival that shows off the work of promising new directors. Rushes 3D animator and special effects artist, John Paul Harney, created the idents for this year's short film event. Strips of red, green, and orange film criss-cross each other as they flow almost dreamily across the screen (see images left).

"This was made in *Softimage|XSI* with a little help from *Photoshop* to create the frames and borders, and took its visual lead from the look of a Photo-Sonics camera," says John Paul. "I was looking for the slow motion and narrow depth of field associated with these types of high speed cameras." Using 3D meant that John Paul could exercise greater control over the shot. He created the animation and then positioned the camera to get the best composition. This proved far more effective than, as John Paul puts it, "dropping a bundle of film in front of a camera and keeping my fingers crossed."

"Using a white background helped keep a vibrancy of colour in the film plates and applying a depth of field shader rounded off the look as film strips passed close to the camera," he continues. "I think taking a relatively simple idea and keeping it subtle is the key here. There's so much you can do in 3D that it can be tempting to chuck everything at a project and get in a complete mess."





3. Is Dennis Hopper really wearing shades? Or did the Rushes team place them on his face? The Ford Cougar ad cleverly blended fact with whizz-bang effects fiction. For every one hour of effects work dedicated to the Puma ad (see page 39), five were dedicated to Cougar. That's a serious amount of work – in fact, nearly 400 hours in total. Some shots of Hopper were composites of various bits of his body. He has his back to the camera in one scene and the figure is composed of a hat, a head, a shoulder, and a torso that Rushes seamlessly glued together.

4. Aardman Animation created this plasticine Nike character who plays with a number of different faces before deciding on his serious game face. Rushes then stepped in to clean up the shots and erase unwanted matter. Rushes fine-tuned the editing to make the mask changing more immediate and effective. Unfortunately, the ad was only aired in the States so we can't view the effects handiwork.

and complex machines with names from the mind of a Star Trek scriptwriter: the latest and greatest Spirit, the reasonably new C-Reality, and the not so young URSA Diamond.

"Telecine is the first process," points out Jones, "but it can also be used at the end to give it that last bit of sparkle." Telecine has become increasingly creative in the last few years. It's possible to manipulate the perspective of a picture, shoot and transfer the film at unusual speeds, and add filters, textures, and de-focusing effects in real-time. It's only when telecine is completed that other visual effects, such as 3D, are applied.

3D? Hmmm. "Maybe we need a new term," ponders Mike Uden, Creative Director at Rushes. His colleague, Bill McNamara, Head of Visual fx, has just been pointing out that there is some pre-supposition, among directors and others, of what 3D work is all about and it makes them a little uppity. "They'll see the BBC2 logo or a fancy title and think that's 3D," Bill says, "We show them some examples of what we've done and that calms them down."

That's when their endless list of high profile work comes in handy. A director may not realise that it was 3D that turned a crowd of 200 into a stadium of 17,000 for an Infineon commercial (see walkthrough). Or that it helped create the Ford Cougar advert where Dennis Hopper meets his old *Easy Rider* self. This is why the Rushes guys like to use the term 'visual effects' these days. After all, says Mike, "we want to give the best creative opportunities and combine all our different strengths into providing the best solution."

To this end, talking to and understanding what a client wants is vital. "They want you to jump aboard and know what they want right away," Bill explains. Ideas are often born out of these initial conversations. "Often you show the director how far they can go, then that stimulates more thought and gives him other ideas," continues Derek Moore, visual fx artist, "Of course, sometimes they want to go too far." He laughs and everyone joins in knowingly.

So working with the best equipment around – Silicon Graphics Octane workstations, machines boasting dual GHz, the latest Pentium chips, 2GB of RAM, and huge swathes of hard drive space – is just the half of it. "Although you need to know technically what to do, the most important part of it is away from the equipment talking to people and clients," Derek believes. They've also had to finely-tune their talents to take on other jobs within the 3D and effects sphere.

"We have to approach effects with a filmic eye," comments Derek. 3D animator and special effects artist, John Paul Harney agrees. "We've learned you have to start from a human standpoint," he says. "3D operators are becoming directors, cameramen, and lighting crew."

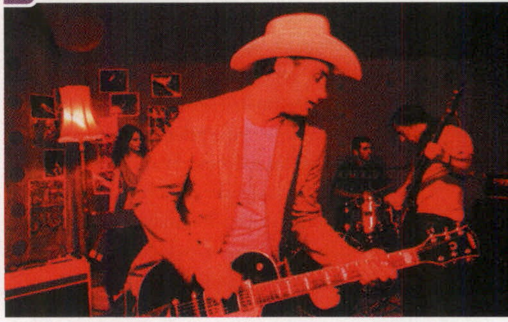
John Paul creates most of his 3D work using *Softimage|XSI*, Alias|Wavefront *Maya*, as well as *Photoshop*, *combustion* and other support packages. But perhaps the biggest and best box of tricks are Discreet's mighty visual effects machines – the powerful highend editing suite, *fire*, and the eye-popping sfx and graphics package, *inferno*.

fire and *inferno* have a part to play in most Rushes projects. The latest Embrace video, *Make It Last*, was composited in *fire*. *inferno* was used to generate lens flares, enhance the in-camera lens flares, and remove and extend set pieces in Neil Finn's latest video, *Hole In The Ice*.

But despite all the fancy kit and a near-infinite list of big-name clients, the Rushes guys are incredibly down-to-earth, genuine, and downright friendly. This wasn't necessarily what we expected before we met them. But they listen, they have great ideas, and even if they didn't have the talent and the tools, we'd love 'em anyway. Maybe that's the best effect to have. **ca▸s**

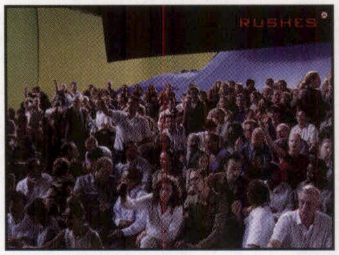
Contact Rushes at **[w]** www.rushes.co.uk **[t]** 020 7437 8676
A selection of some of Rushes coolest adverts can be viewed on its Website, including ads done for Ford, Vodaphone, After Eight, Schweppes, and Mitsubishi. You can also view some of the company's showreels online.

1

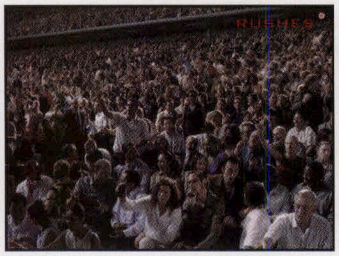


Crowded house

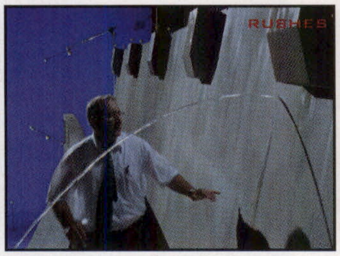
Rushes turns a small studio of 200 into a stadium of 17,000 – as if by magic



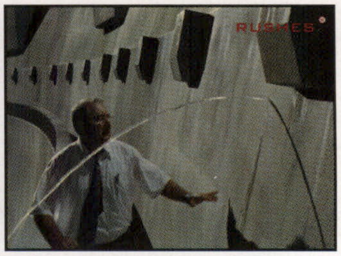
1 This commercial for microchip maker, Infineon Technologies, opens with a shot of a small crowd of people that then pulls back to reveal a giant stadium of people, all asking questions. The scene was shot with 200 people filling a small studio space that rather resembles the less grand environs of Kilroy. Rushes then swelled the crowd to a massive 17,000 by using motion control passes.



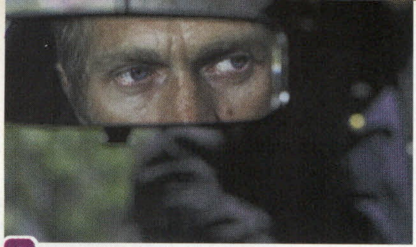
2 A clean plate was tracked in 3D using 2d3 *boujou* from which Rushes built the huge auditorium. The stadium was filled with people using hundreds of 2D plates of crowds from the original shoot. The scene was built using *SoftimageIXSI* and a special script for sourcing the vast number of clips needed for the final render. The elements were then composited in *Inferno* and lights and shadows added for realism.



3 Another scene in the commercial opens onto a sprawling lake tamed on one side by a massive dam. A dam supervisor rushes to stop jets of water that are breaking through the concrete. A small section of a model dam was shot in a studio. The camera swings down from above to zero in on the supervisor – a complex shot that had repercussions in the post-production work.



4 The dam was given a weathered look in *Inferno* and extended on top of the bluescreen to create a dam of more awesome proportions. Using 3D tracking software *boujou*, the Rushes team was able to create a seamless set extension as the camera closes in on the supervisor. The Fire team then added further spurts of water and a river at the bottom of the dam that helped accentuate its height.



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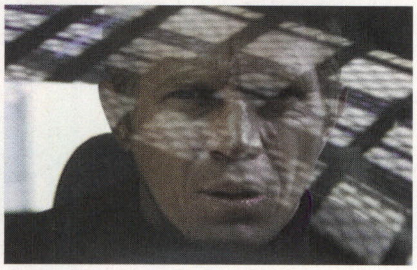

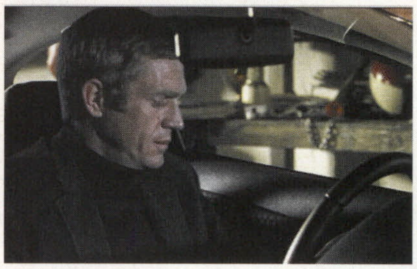

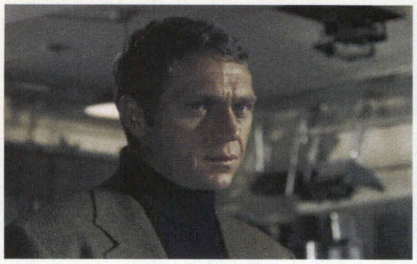

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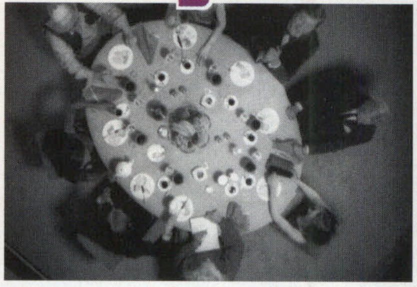

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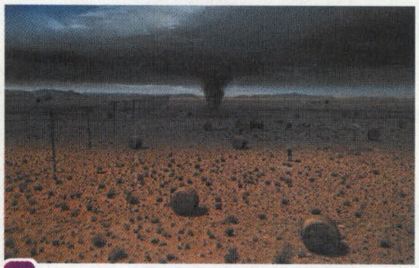


5

1. *inferno* was used to generate lens flare effects in Neil Finn's latest video, *Hole In The Ice*.

2. Rushes packed the high-end effects suite, *flame*, into a Winnebago when shooting the background work for the Steve McQueen Puma ad. Director Paul Street shot exactly the same scenes in San Francisco that were in the movie, *Bullitt*. In some shots, a stand-in was used and Rushes later put Steve McQueen's head on to the body. The titles were made with matte boxes in the genre of *The Thomas Crown Affair*, and shot on a rostrum camera, with wobble added afterwards.

3. Rushes put Marilyn Monroe, Naomi Campbell, Einstein, David Niven, James Dean, and Bobby Moore around the After Eights dinner table with Stephen Fry. *flame* was taken on the shoot and fed pictures directly out of the film camera's video tap. This gave an idea as to how well the living actors could be composited with the archive footage.

4. The Embrace video, *Make It Last*, was a take on the *Blair Witch*-style black and white documentary footage. The film, which followed four Embrace fans getting lost in the woods, was composited in *fire* and graded in C-Reality.

5. Rushes created a full-blown twister for Vodaphone. *Softimage|XSI* was used to create the horses and telegraph poles. *Maya* was used for the twister and its debris. *inferno* then combined all 3D and live action components, adding time simulated camera moves to skies and landscapes.

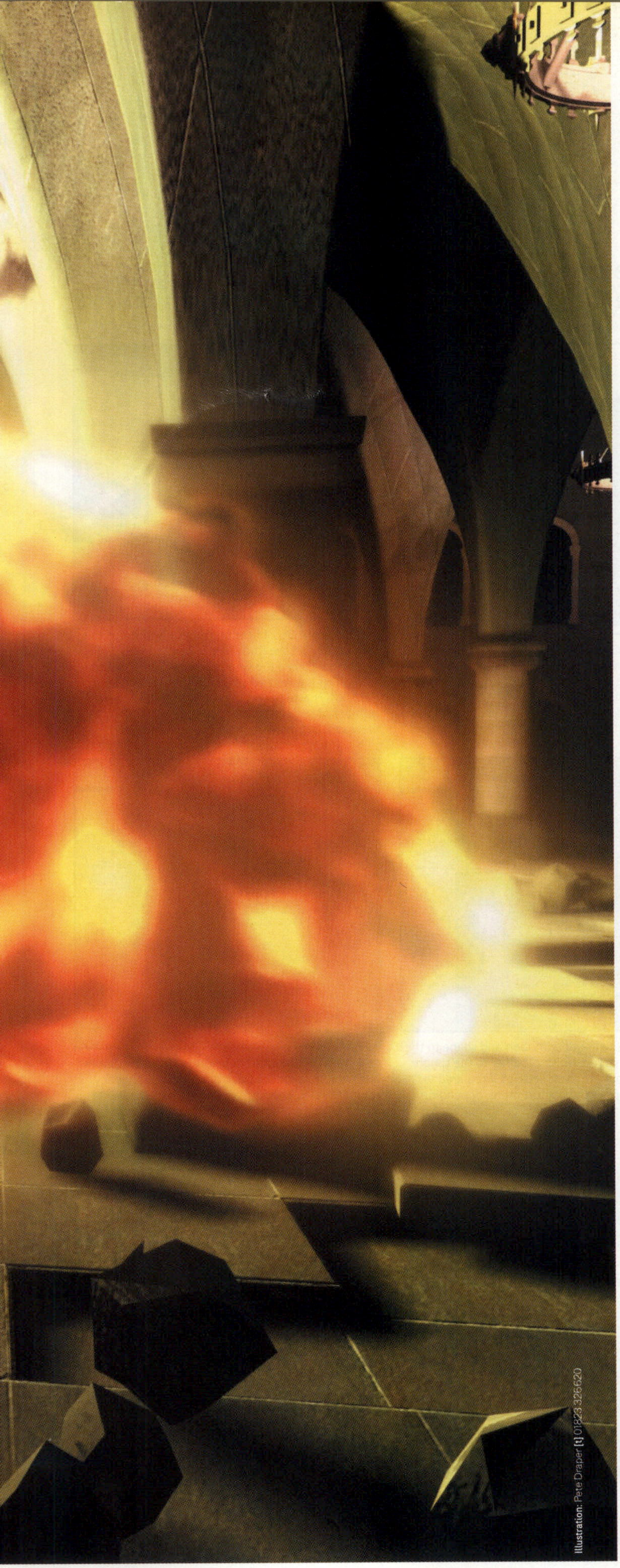


Illustration: Pete Draper **[t]** 01823 326620

Create dragon fire in 3ds max

Realistic looking and flowing fire is tricky without some fancy third-party plug-in. So here we will try to do just that with *3ds max 4*'s own toolkit. Up for the challenge?

Fire effects are one of the most awkward elements to simulate in 3D. Normally, an artist would have to resort to stock footage and pass the task to a compositor to merge the fire element into the scene, or purchase a third party plug-in to generate the effect.

Granted, this can give a very nice result, but what if you can't afford these resources? Creating fire in 3D can be a challenge, but one of the most enjoyable, with one simple value change altering the fire's behaviour from a simple flame to a more impressive wall of fire like the one we've created here.

Depending on the situation and combustible material, fire can take on many forms: from tendrils and flickering shapes through to rolling clouds. Here we are going to attempt to introduce a realistic turbulent fire cloud – like a kind of flamethrower – being shot out of our dragon's mouth to add extra drama.

All of the scene elements have been previously created, so all we need to concentrate on is the fire, its appearance and motion and how it interacts with the rest of the scene. ➤

Files on disc

The files required for this tutorial are on the CD in the Tutorial\Dragonfire folder.
Expertise provided by Pete Draper, Head of Media for Orchard CDG
[e] pete.draper@ xenomorphic.co.uk
[w] www.xenomorphic.co.uk

Part 1: The Particle System

We'll start by loading the scene Dragon_hall.max on the cover CD. The scene is lit using several Omni lights from each chandelier to create the right ambient effect...

Files on CD:

Dragon_hall.max : The basic *3ds max 4* scene

Dragon_hall initial render.jpg: The basic scene

Dragon_hall_final.max: The result of the tutorial

Dragon_hall final render.jpg: The result of the tutorial

Dragon_hall_final.mov: QuickTime Sorensen render of the final fire effect

Maps:

Floor dirt mix.bmp

Grycon7.jpg – as supplied with *3ds max*

Interior floor brick.bmp

Interior pillar.bmp

Interior wall brick.bmp

Wing diffuse.bmp

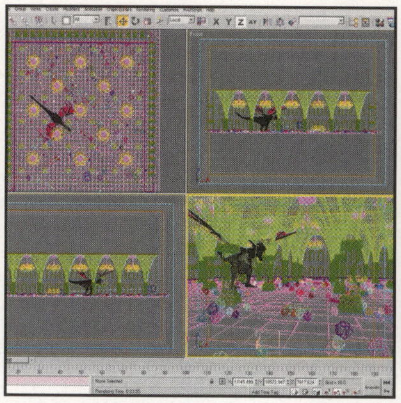
Wing opacity.bmp

Fire plug-ins

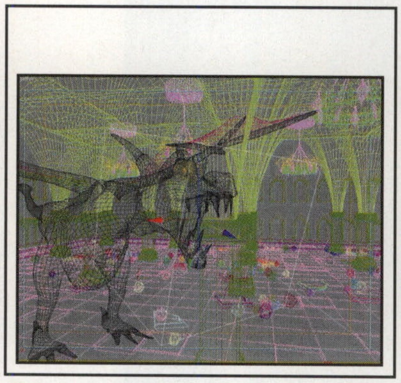
As mentioned, additional third-party plug-ins could be used to add more realism to the fire effect. The most effective ones for the fire appearance are *Afterburn, Pyrocluster, Outburst* and *Phoenix*: the first three generate volumetric fire and smoke, and *Phoenix* is designed to generate tendril-like fire. Cebas' *Pro-Optic Suite* could also be used in conjunction with *Pyrocluster* to enhance the glow effect to add more effective intensity to the fire.

Particle systems

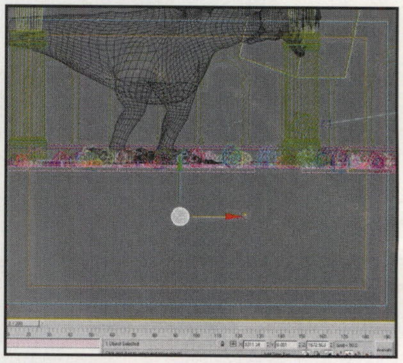
max's Particle System and corresponding SpaceWarps as it stands, has its limitations. To create any real convincing fire simulation, the Particle System must interact with the scene. In which case you may want to look into the use of particle dynamics and/or the use of an additional Particle System such as *Particle Studio* or *Thinking Particles* which enables you to design the Particle System to the relevant needs of the scene.



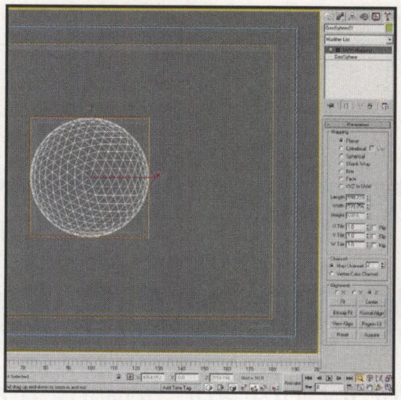
1 The downside to these Omni lights is that they increase your rendering time, so feel free to remove some lights from each chandelier and increase the multiplier of the others (which are all instanced).



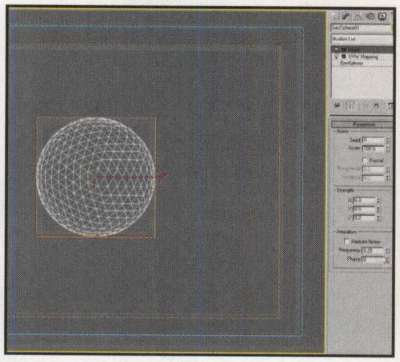
2 This tutorial is based on the fire effect, so we won't concentrate on the animation of the beasty with the bad breath. Note the dummy object around its head, though: this will be used later on to align and position the fire emitter and any additional lighting we require.



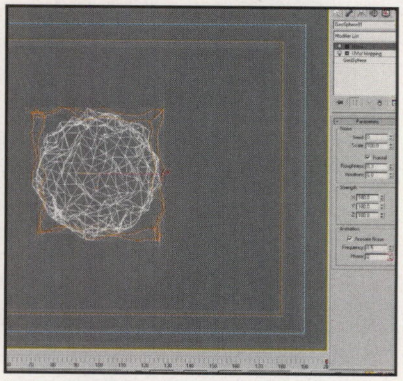
3 Create a Geosphere primitive anywhere in the scene. Set the Radius to 300 with seven segments. Ensure the Geodesic Base Type is set to Icosa. This is a relatively high segment count for a Particle System, so you may wish to reduce the number of segments when working within the viewport, but increase it back when rendering.



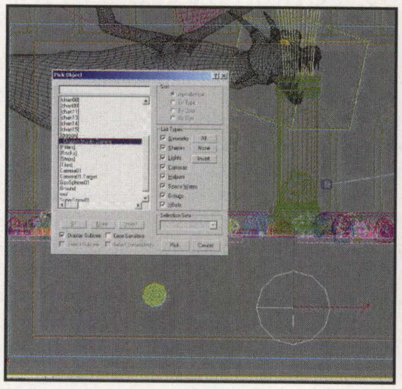
4 Assign a UVW Map Modifier to the sphere and set the Map ID spinner to 2. We are using Map ID 2 because the Particle System itself uses Map ID 1 whenever the sphere is referenced by the Particle System, which can cause conflicts.



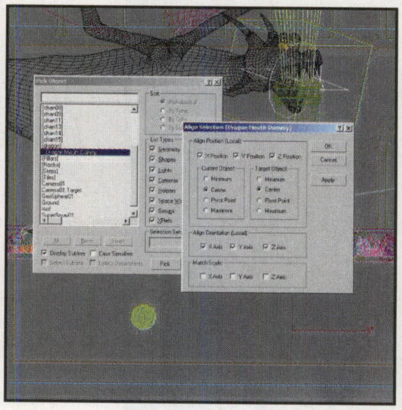
5 To add some irregular motion and shape to the particle, assign a Noise Modifier to the sphere. We can then animate these settings if required to make the fire ripple and contort more, depending on our requirements. This modifier is positioned after the UVW Modifier, so it will therefore also deform the map.



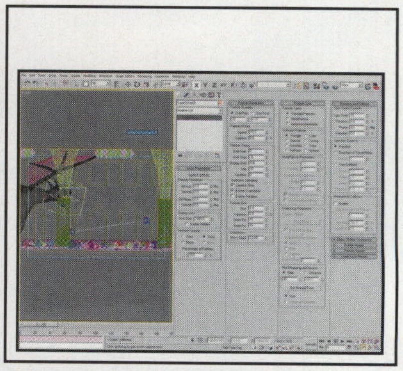
6 Turn on Animate Noise in the Noise Modifier's Animation rollout and amend the Frequency spinner to 0.5. This increases the rate of the Noise Modifier's animation. Turn on Fractal and increase the Roughness to 0.3, set all X, Y and Z Strength spinners to 100.



7 Create a SuperSpray Particle System and set the Icon Size to 1000 so we can see it clearly and use it as a sense of proportion. Select the Align tool and click on the Select By Name icon (or press H). Select the Dragon Mouth Dummy object as the object to align to.



8 In the Align pop-up box, check on X, Y and Z position align and also check on local X ,Y and Z Align Orientation. Clicking OK automatically positions and rotates the Particle System exactly where we want it to be, inside the dragon's mouth.



9 With the Particle System still selected, expand the Command Panel by pulling it out from the left-hand side to the right. The Particle System has a lot of rollouts and settings that we need to amend, so viewing all of them at once helps the process and aids our workflow. Select the Particle System's properties and turn off Cast and Receive Shadows.

Materials

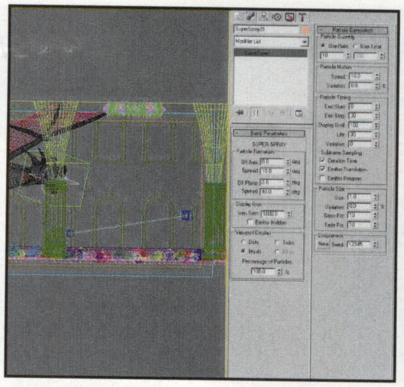
Due to the nature of our fire simulation, we have to use several mixed and composited materials to create the desired result. Because of this, you will find that render times in the scene increase dramatically. The main culprit behind this is the Shellac Material, which could be replaced with a Composite Material, additive transparency or having two Particle Systems; one with the bare fire material and the other with the dark smoke effect.

Illumination

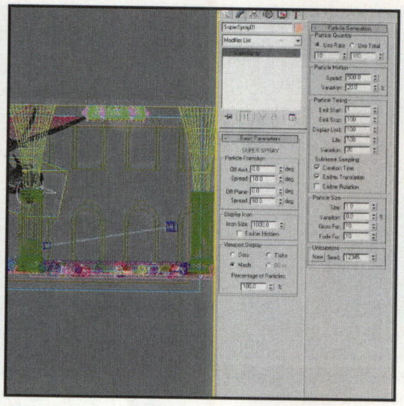
max currently doesn't have any geometric-based lighting system. Therefore, the fire cannot accurately illuminate the scene depending on its intensity, so we have to simulate this with a Glow post effect. The Omni light positioned in or near to the dragon's mouth is the main light source for the fire illumination, which could be cloned, reduced in intensity, moved further along the particle trail and animated to illuminate the scene as the particles pass over it.

Particle trails

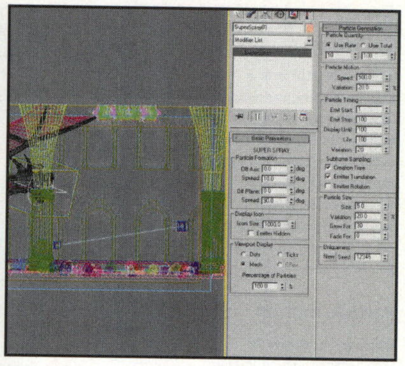
Our fire set-up currently behaves like clouds. More tendril-like effects can be created by amending the Material settings slightly, assigning them to a new and smaller reference sphere, and turning on Particle Spawning in the SuperSpray Particle System. By choosing Spawn Trails, each born particle will generate an additional few particles, and by tweaking the settings, we can get it to move erratically, and spawn the new reference sphere for it to die abruptly like a tendril.



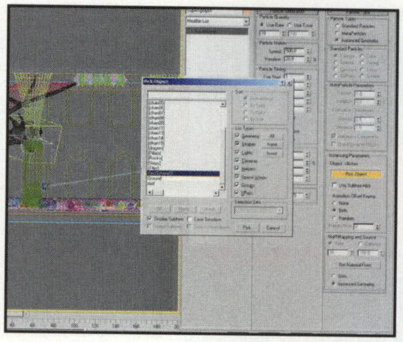
10 In the Particle System's Basic Parameters rollout, change the Particle Formation Off Axis Spread to 10 degrees and the Off Plane Spread to 90 degrees. Change the Viewport Display to Mesh and the Percentage of Particles to 100 to view the entire Particle System.



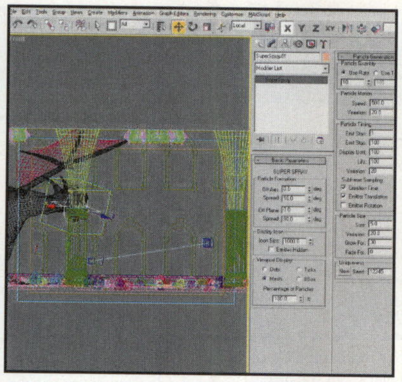
11 In the Particle Generation rollout, amend the Speed spinner value to 500 with 20 per cent variation. In the Particle Timing section, set the Emit Start spinner to 1 and the Emit Stop and Life spinners to 100 with 20 variation.



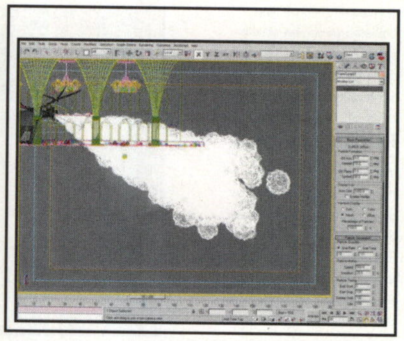
12 In the Particle Size section, set the Size spinner to 5 with 20 per cent variation, amend the Grow For value to 30 and set the Fade For value to 0. These set the general physical size of the particles. They don't have to be increased as much as normal because the Particle Type will be set as Instanced Geometry.



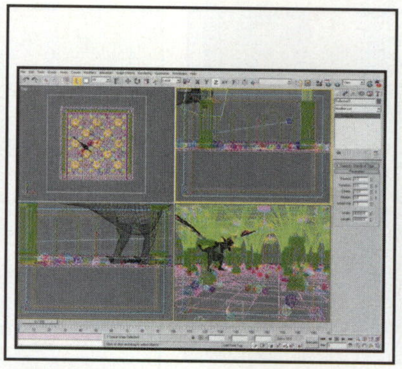
13 Under the Particle Type rollout, set the Particle Type to Instanced Geometry. In the Instancing Parameters section, click on the Pick Object button and choose the Geosphere. Under Animation Offset Keying, check the Birth Radio icon. This makes the particle begin animating the Noise Modifier when a particle is born, adding more variation to the particle appearance.



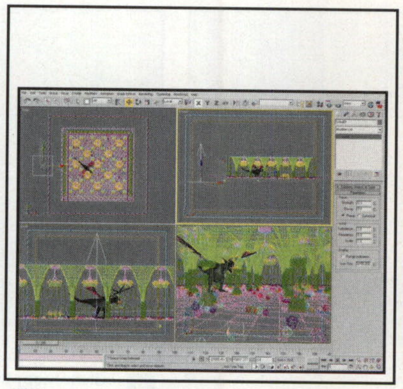
14 In the Rotation and Collision rollout, set the Spin time to 20 with 50 per cent variation. Under the Object Motion Inheritance rollout, set the Influence spinner to 0. So if the SuperSpray emitter is moved or rotated, the particles don't move or rotate to follow but continue on the same path.



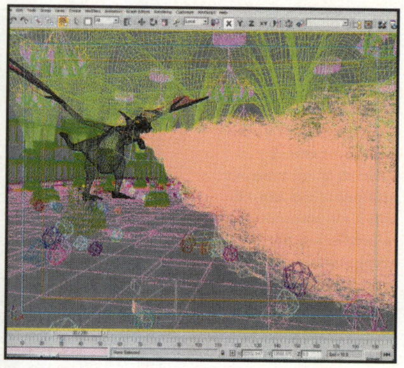
15 Scrubbing the Timeline forward, we should now see the particles being emitted from the dragon's mouth in a linear motion: further still, we will see them intersect the floor and continue downwards. Create a large (about 80,000 square) Deflector SpaceWarp slightly larger than the ground, and position it just slightly above the ground and tiles.



16 Set the Bounce to 0.2 and the Chaos to 10 per cent. Bind the Particle System to the SpaceWarp. We should now see the particles reflect back up, although half of the particles still remain below the ground and Deflector. This is normal because *max*'s Particle Collision detection is set to the centre of the particle.



17 To add some more random motion to the fire effect, create a Wind SpaceWarp and rotate it so the direction arrow is pointing vertically at the scene's arched roof. Set the Wind's Strength to 0.3 (only a slight breeze!) and the Turbulence to 2. Bind this SpaceWarp to the Particle System.



18 We shall now create the fire material. The material is comprised of several elements: the main billowing fire effect, the smoke cloud material, the combination of the above and a transparent element to mask out any harsh edges of the particles. Combined with this, the use of material IDs to add a post glow effect. ➤

Part 2: The fire materials

To emulate the fire effect, we'll create a single material composed of several individual materials to create the best material possible

Interparticle Collision

With the amount of particle chaos in the scene, particles do often collide but have no effect on one another. To make the fire motion more realistic, turn on Interparticle Collision, and increase its Value spinner to detect collisions at a subframe value, but not too high because geometry updates will be slow.

Particle motion

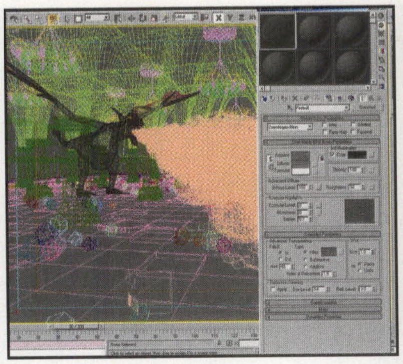
Currently, the particles are simply emitted from the dragon's mouth. To generate a more realistic motion, try animating the speed of the particle from 0 up to the set value. Also animate the birth rate from 1 up to the set value. With these values animating over a short time, coupled with Interparticle Collision, we can see smaller particles being forced through the larger particles as the fire's full velocity is achieved.

Particle Age map

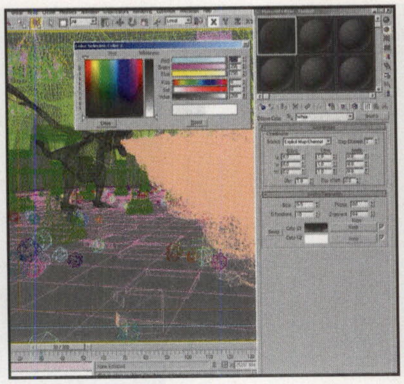
In the tutorial, we haven't taken the particle's appearance as it dies into consideration. This is because of the nature of the material set-up and the inability to assign a Particle Age map to the referenced sphere because the Particle Age material has to be directly assigned to the Particle System and not to instanced geometry. If we assigned the fire material directly to the Particle System, we wouldn't be able to lock the material to the individual particle, and as a result would have the particles 'passing under' the fire material.

Other material methods

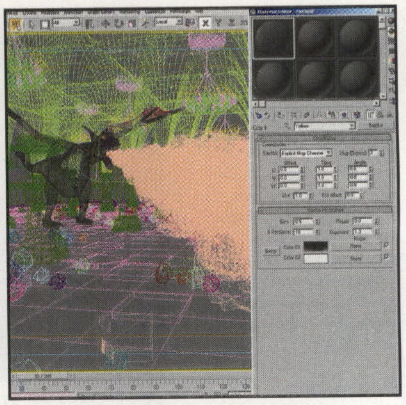
Depending on the design of your fire, you may wish to create the particles and materials differently. Facing particles with a fire material set to face map and additive transparency keeps render times down and gives an effective result, but does not generate the fireball-type effect generated in this tutorial with the darker patches of fire and smoke.



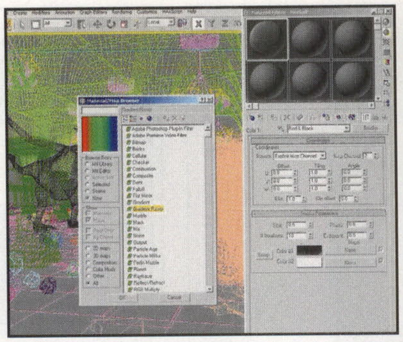
1 We shall start with the main fire material. Create a new standard material labelled Fireball and change its Shading Type to Oren-Nayar-Blinn. Check on Self-Illumination. Set the Specular Level and Glossiness spinners to 0. In the Extended Parameters rollout, set the Falloff Amt spinner to 65.



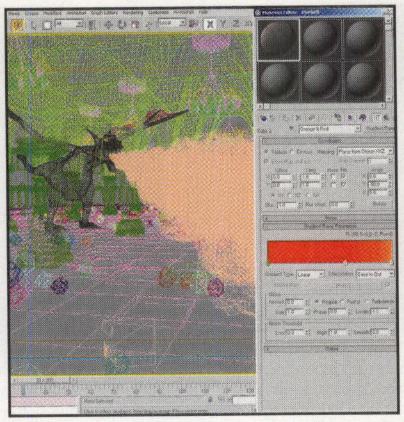
2 In the Diffuse Color slot, create a new Smoke map and label it White. Set the Size spinner to 0.5, the # Iterations spinner to 10 and the Exponent to 0.4. Select the Color #2 swatch and set it to White (RGB 255,255,255). Set the Source to Explicit Map Channel and the Map Channel to 2.



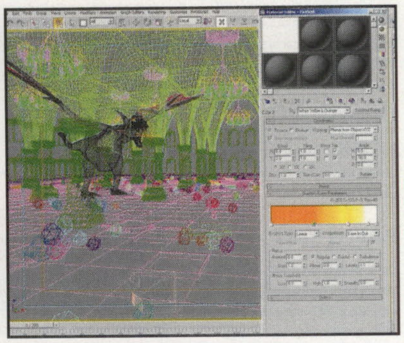
3 In the Color #1 slot, create a new Smoke map and label it Yellow. Set the Size spinner to 0.5, the # Iterations to 10 and the Exponent to 1.3. Set the Source to Explicit Map Channel and the Map Channel to 2.



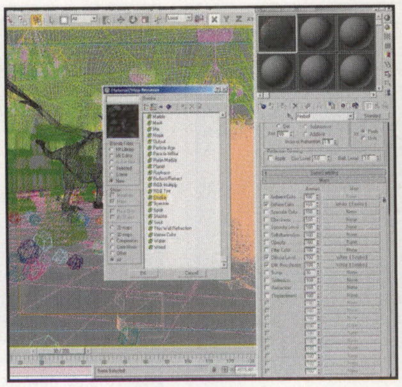
4 Create a new Smoke map in the Color #1 slot and label it Red & Black. Set the Size to 0.5, the # Iterations to 10 and the Exponent to 0.5. Set the Source to Explicit Map Channel and the Map Channel to 2. In the Color #2 slot, create a new Gradient Ramp map and label it Orange & Red. Change the Mapping to Planar from Object XYZ and set the Y Angle spinner to 90.



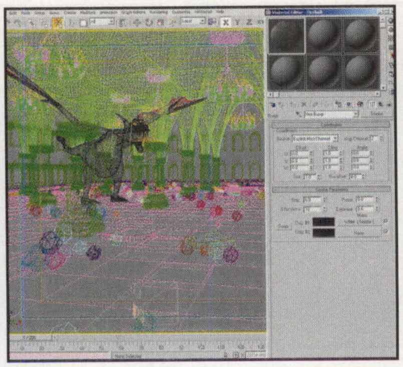
5 In the Gradient Ramp Parameters rollout, set the Interpolation Type to Ease In Out. Design the Gradient as shown, with keys at 100 (RGB 255,163,0), 63 (RGB 255,0,0) and 0 (RGB 255,0,0).



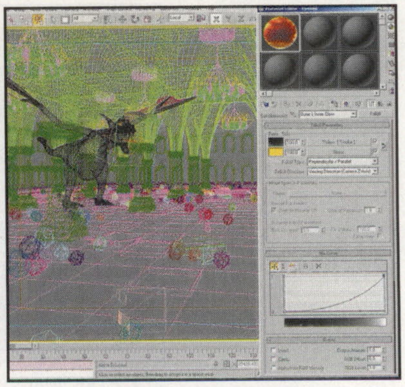
6 In the Yellow Smoke map, create a Gradient Ramp map in Color #2 and label it White Yellow & Orange. Change the Mapping to Planar from Object XYZ and set the Y Angle spinner to 90. Change the Interpolation Type to Ease In Out and design the gradient as shown with keys at 100 and 92 (255,255,255) 73 (255,255,0) 40 and 0 (255,163,0)



7 Back at the top level of the material, instance copy the Smoke map tree in the Diffuse Color slot to the Diffuse Level and Diffuse Roughness slots. Create a new Smoke map in the Bump slot and label it Xtra Bump. Set the Source to Explicit Map Channel and the Map Channel to 2.



8 Instance copy the White Smoke map tree into the Color #1 slot and make the Color #2 swatch black. Set the Size to 0.5, the Iterations to 10 and the Exponent to 0.6. Back at the top of the material, set the Bump spinner to 60, create a new Falloff map in the Self-Illumination slot and label it Outer & Inner Glow.



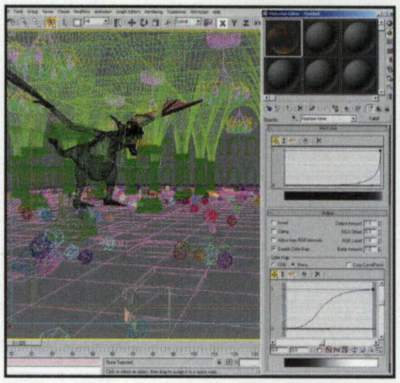
9 Instance copy the Yellow Smoke map into the first slot and set the second swatch to RGB 252,220,0. Amend the Mix curve at the bottom of the map so that it resembles the one above. Back at the top of the material, create a new Falloff map in the Opacity slot and label it Opaque Inner.

Fire motion

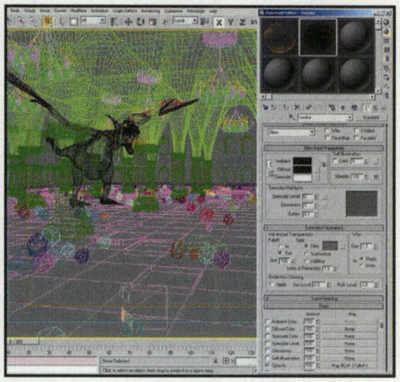
To add more dramatic motion to the fire, try rotating the dragon, Omni light and SuperSpray Particle System so the particles just clip a close pillar by about 25 per cent. Create UDeflector and Cylindrical Decay SpaceWarps (to form the particles around the pillar) and adjust their settings and position accordingly to react with the pillar. Note that once the SpaceWarps have been bound to the SuperSpray system, the Viewport update time increases. To stop particle updates in the Viewport, simply hit the Escape key.

Conclusion

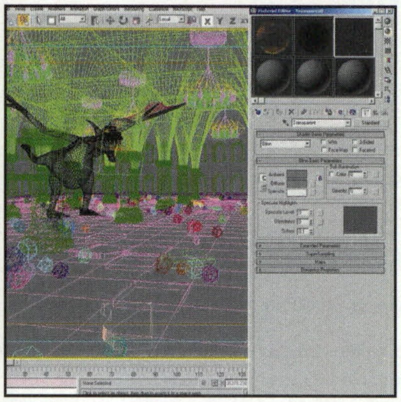
Due to the nature of the Particle System, the geometry count, the number of lights and the resolution of the image, it may take a white to render even a single frame. Consider lowering the particle birth rate if you find it's taking too long, or reduce the detail of the referenced sphere. You may also wish to animate the phase of the smoke material to add more chaos to the fire effect. Should you decide to render out the scene at a size other than the default (640x480), you may wish to adjust the Glow settings as they will appear more or less intense depending on the image size.



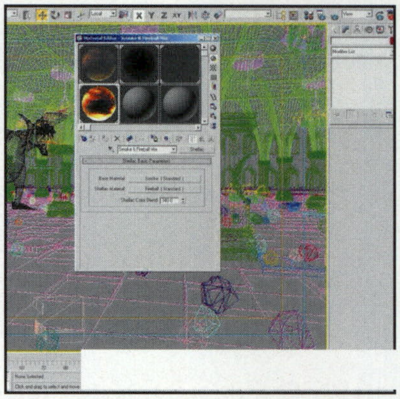
10 Set black as the second swatch colour and instance the Yellow Smoke map into the first slot. Amend the Mix and Output curves to match those displayed in the screenshot. We have now completed the main fire material. The rest of the material structure consists of more simple materials.



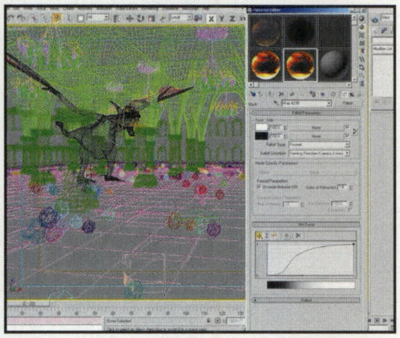
11 Create a new Standard material and label it Smoke. Set the Diffuse swatch to Black, Specular and Glossiness to 0, change the Advanced Transparency Type to Out and set its spinner to 100. In the Opacity slot, create a new Falloff map, set the Type to Fresnel and flip the white and black colours.



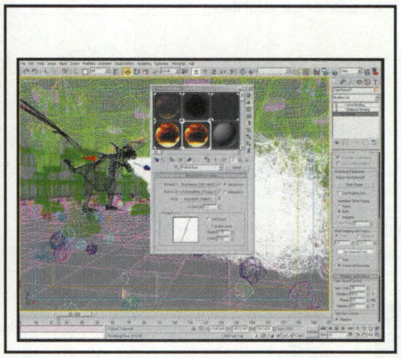
12 Create a new Standard material and label it Transparent. Set the Specular, Glossiness and Opacity spinners to 0 to create a completely transparent material. That's all the materials created, so now we'll put them all together.



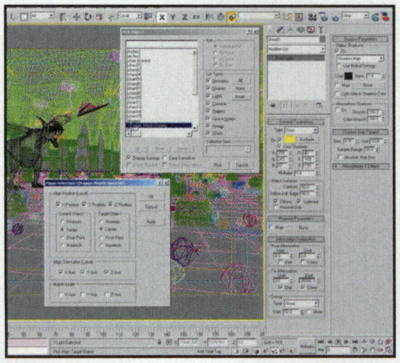
13 Create a new Shellac Material and instance copy the Smoke Material to the Base Material slot. Instance copy the Fireball Material to the Shellac Material slot and set the Shellac Color Blend spinner to 340. Label this Smoke & Fireball Mix.



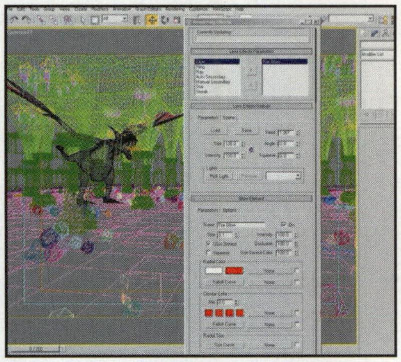
14 Create a new Blend Material, label it Fireball End Mix and assign a Material ID of 1 to it. Instance copy the Transparent material to the Material 1 slot and the Smoke & Fireball Mix Shellac material to the Material 2 slot. Create a Falloff map in the Mask slot and set the Type to Fresnel. Flip the black and white colours and amend the Mix curve to the one displayed.



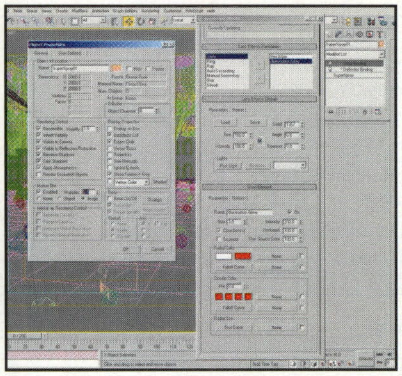
15 Assign this material to the Sphere and in the Particle System under Mat'l Mapping and Source, check on Instanced Geometry and click on the Get Material From: button. Create a new Omni light and set the colour swatch to 255,245,87. Ensure shadows are checked on and amend the Multiplier to 5.



16 Set the Contrast and Soften Diff. Edge values to 50 and check on Use and Show under Far Attenuation. Set the Start spinner to 0 and the End to 30000. Under the Shadow Map Params rollout, set the Bias to 0.01, the Size to 1024 and the Sample Range to 20. As with the Particle System, align this to the Dummy object.



17 In the Environment window, check that Ambient is set to 0,0,0. In the Effects window, create a new Lens Effects effect. Add a Glow effect and name it Fire Glow. In the Glow Element rollout, set the Size to 0.1, the Intensity, Occlusion and Use Source Color to 100. In the Options tab, ensure that Effects ID is checked and set to 1.



18 Create a new Glow effect and label it Illumination Glow. In the Glow Element rollout, set the Size to 3, Intensity to 200, Occlusion and Use Source Color to 100. In the Options tab, ensure Effects ID is checked and set to 1. Hide the Sphere, select the Particle System and add 0.5 of Image Motion Blur. Voilà.

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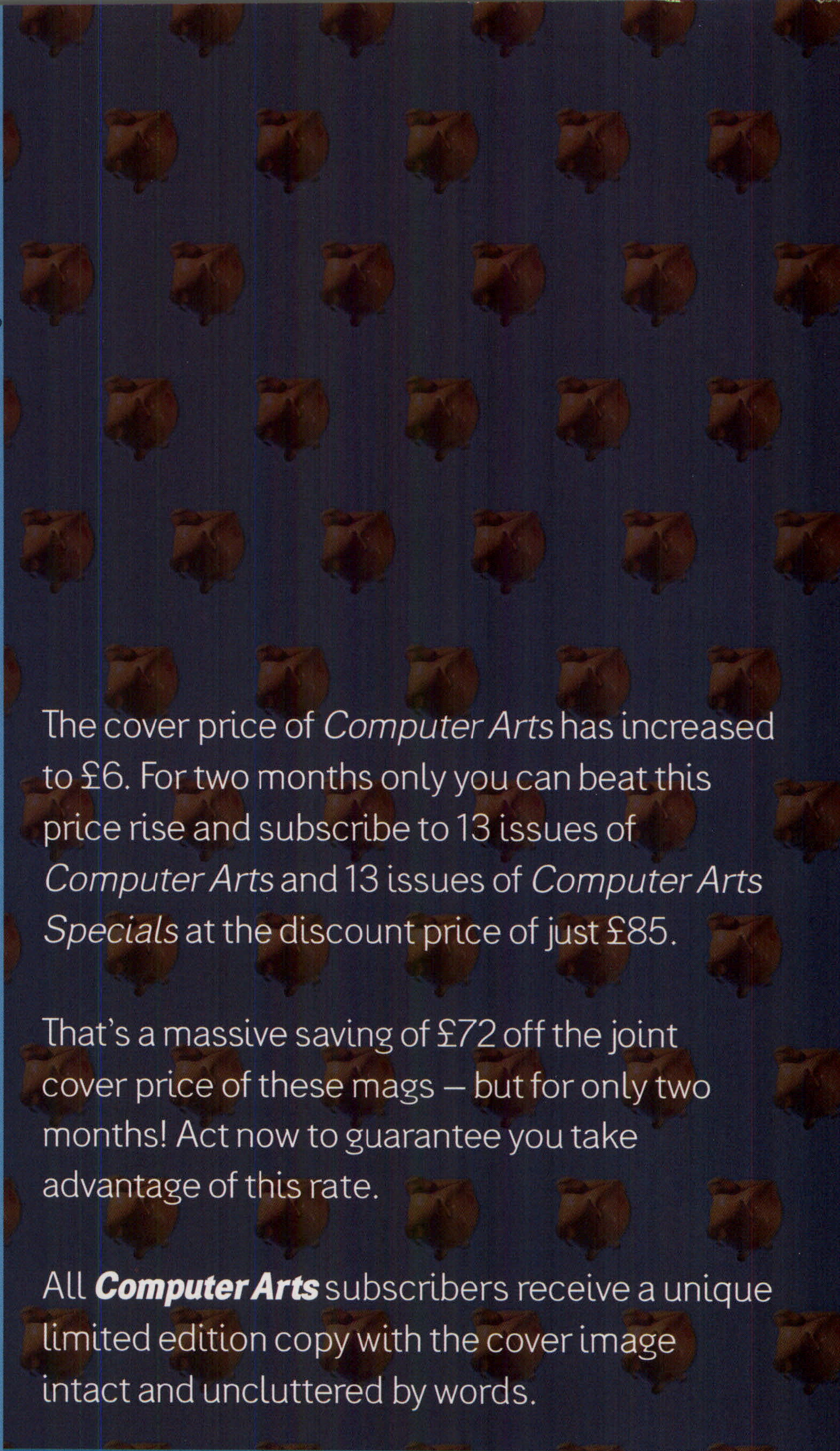

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Band of Brothers

A third of the visual effects in Spielberg and Hanks' *Band of Brothers* were put together by HBO's in-house vfx team using *After Effects*. Sean Farrow was on that team. He takes us behind the scenes...

All images © HBO 2001

Steven Spielberg's and Tom Hanks' mini-series for HBO and the BBC follows the fortunes of Easy Company, from training to their part in the capture of Hitler's Eagles Nest. The ten, one-hour episodes focusing on specific battles and key characters throughout their journey are being shown on BBC2. The style and storytelling is comparable to Steven Spielberg's *Saving Private Ryan*, and is gritty, realistic and as historically accurate as possible. Surviving veterans from Easy Company were involved at an early stage of the production to ensure that events were depicted accurately.

A soldier is ambushed and left wounded while his comrades attempt to get to him under fire from two German machine gunners and a rifleman. It's an intense scene, with plumes of snow, muzzle flashes and a huge amount of tracer fire. If this sounds familiar it could be because you've just seen it on the blockbusting 10-episode WW2 series, *Band of Brothers*. Realistic as the final scene looks though, in fact parts of it never exisited. The second German machine gunner was a digital fabrication put into the scene using Adobe *After Effects* by HBO's dedicated in-house vfx team.

Having a team like this was unusual for such a big budget production, especially one that tackled so many integral shots – there were more than 645 visual effects in Spielberg and Hanks' epic series – and we did over 241 of them, all in *After Effects*. Some shots were never planned as vfx shots, but as the editing process progressed, more shots were pulled out as enhancements, mainly because we were there to deal with them.

The team was headed by Visual Effects Supervisor Angus Bickerton, (*Lost in Space, Batman*), who was joined by Joe Pavlo, as his Assistant. Both Angus and Joe were on location during the shoots and were on the project from an early stage in the production. Joe also did some on-set visualisations and it was originally planned that he'd be the only one doing the fixes and clean-up jobs after shooting. However Angus, Joe and some of the production staff saw an opportunity to expand the department's remit into something that could handle more than the occasional muzzle flash. No one quite realised how well this would work out.

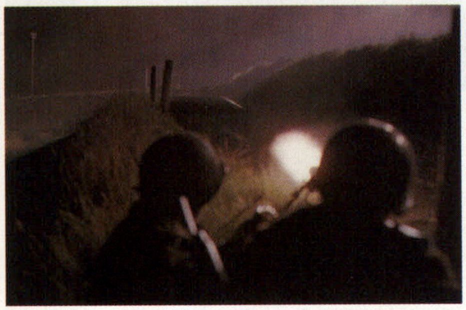
I joined in early 2001, shortly after Duncan Kinnaird and Adrian Ratley who had been on the production since the beginning as an on-set co-ordinator, vfx assistant and data administrator. Kevin Ahern was the vfx Editor, Tim Field and Barrie Hemsley were the vfx production staff: making eight of us in total.

Reducing costs

In a production of this type and scale the visual effects were always going to be a major part of the budget and the production as a whole. Some of the major CG scenes were done by The Mill (the flotilla of planes night-time D-Day invasion in episode two) and Cinesite (various parachute drops, Notre Dame, Paris and so on), the largest external supplier with 120 vfx shots. These companies were contracted large-scale shots with 3D environments, model shoots, extensive modelling, 3D compositing and matchmoving. Visual effects companies Men From Mars, Light Matters, Hollywood Digital and MPC also contributed to various vfx shots.

Joe had proved that more complex shots could be done in a fraction of the time, and at a reduced ➤

This shot is among a sequence where Easy Company take a German machine gunner position at a crossroads.

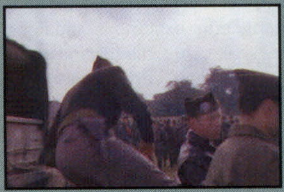


Muzzle flash and tracer fire were hand animated to give the impression of distance and trajectory.

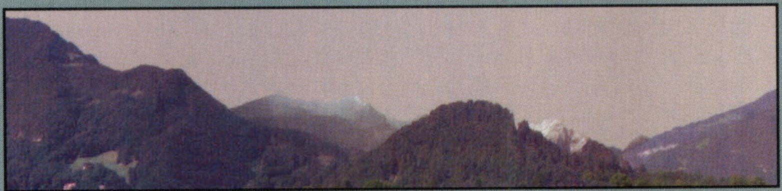
The Alps in Hatfield

Since nearly all the shooting was done in Hatfield, Hertfordshire, a great deal of additional scenery had to be blended into the shots. In-house, we did ten mountain shots, none of which were simple because there was always something in the foreground, usually in motion, and there would often be camera movement as well. I had a set of three shots in episode 10, where Captain Sobel reappears.

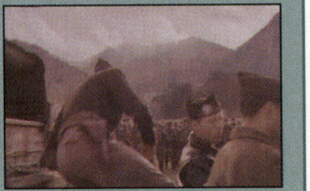
The mountain ranges were generated from a series of polaroids taken in the Alps earlier in the year. I scanned them in, and graded them together to get two panoramas. Both a frontal and a reverse were required because the sequence had a reverse angle. We also needed wide panoramas because a couple of the shots panned across. The foreground was extensively rotoscoped and keyed in *Commotion* and *After Effects* and I used expressions on the tracking data to give the impression of parallax distance. I had to consult a great deal with the vfx editor to make sure that we didn't put in mountains which would then affect other shots in the scene. Extra foliage and tree elements were painted in to bring back details of the horizon and buildings. We also removed some trees to give a better view of the mountains.



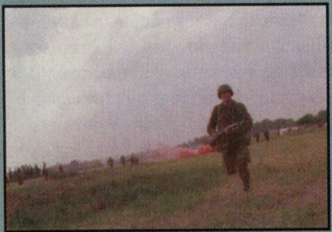
The shot pans from left to right and the truck drives in from off camera, making this shot especially tricky.



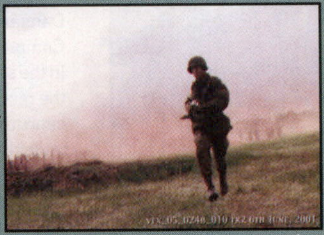
This panorama was made up from eight photographs, some from different times of day.



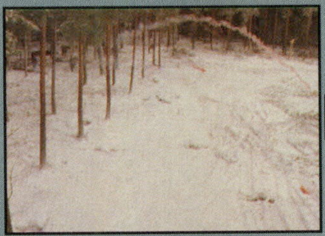
The final composite with the mountains graded to match the lighting of the shot.



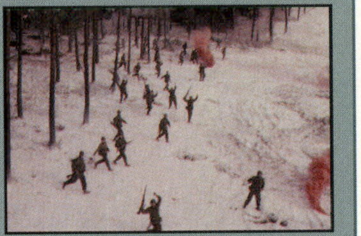
The vehicles on the right had to be removed, and the smoke enhanced significantly.



The final shot of Winters running across the open field with his company following under the cover of the CG smoke.



The clearing has been extended to give the impression of it being the edge of the forest, rather than an enclosure.



The company run out into the clearing to wave at passing Allied bombers.

POW camp looting shot, where the woman in red needed to be the focus of the shot.

financial overhead compared to bigger facilities. In our 12 months on the job we finished more than double the number of shots of any other contributor. More importantly though, we also managed to consume more than a hundred bottles of wine and an unspecified amount of frappuchino in the spirit of team building.

Having an in-house team on call instead of relying on an external provider meant that we were able to be much more flexible, organised and responsive, since we were next door to the VFX Editor, and a minute away from eight Avid editing suites one floor down at our building, hired from Cinesite in Soho. Having the VFX Supervisor to call on for approval and guidance on certain shots was also useful.

Once the shots had been requested and defined, the VFX Editor would locate the shots in the episode and run through the scenes with whoever was going to do the composite. Angus would describe what was needed, then we'd take the shots from the server after they'd been scanned and start work.

We'd send Avid playout versions back to the VFX Editor for viewing approval by himself and Angus, and so on. Once they'd been approved in the cut, we'd send them back to the FTP server to be put back onto film. We'd then watch them in Cinesite's screening theatre, and Angus would approve them, or suggest improvements. Once approved, the shots would move onto the next stage, which would be grading and secondary keying.

We worked on Apple dual-processor G4s with *After Effects 4*, and later on in the production, version 5. *Commotion 2.2* was used extensively since it handled film resolution tracking and rotoscoping with speed and accuracy. *After Effects 5* enabled us to work and render at 16-bit, and it handled film formats better than previous versions. The 16-bit feature is useful when working on film, because of the higher bit depth and resolution of film. You'll occasionally see banding in highlights and shadows of effects shots if they are produced in 16-bit - banding being the effect of visible steps from light to dark, rather than a smooth graduation.

The 16-bit issue was particularly relevant in some of the muzzle flash shots and especially in a shot where a soldier is hit in the chest by shrapnel from an explosion in the background. The CG explosion flare in the background was banding-free, because of the 16-bit output of the shot. We were working on 10-bit Cineon 2K frames, rather than regular 8-bit image files. *After Effects 5* recognises the file in its native format, and properly interprets the expanded bit depth. The 2048x1556 frames were scanned by Cinesite with a Lightening Film Scanner and put onto their FTP server, which we uploaded to the G4s at about one frame per second when we needed them.

All in a day's work

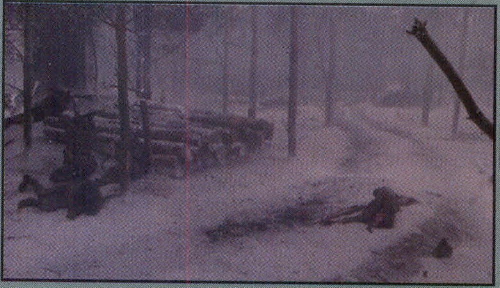
Typical shots ranged from simple effects such as shot fixes, some dust and scratch removal, extra muzzle flashes and tracer fire, to more complex effects including rig removal during explosions, additional explosions, camera shake, shot stabilisation, bullet hits to people, trees, and snow-covered and regular ground. As time went on, we also added mountains, trees and frosty breaths in the winter scenes, CGI smoke generation, matte paintings and set extensions. We removed people and changed the action and pacing of shots to fit the edit and storyline better, plus we had a few shots with crew and catering vehicles in camera, which obviously had to be removed.

One such shot was of Lieutenant Winters (played by Damian Lewis), one of the key people in Easy Company, running across an open field in episode five. In the sequence, he sprints across an open field, while the rest of his company wait in a trench for smoke canisters to disperse enough smoke for them dash under its cover. The original shot had very little real smoke, and a couple of crew vehicles, including a bright red pickup and a white van were sitting incongruously in the background. The camera was handheld and the motion of the shot was erratic, which made tracking anything extremely tricky.

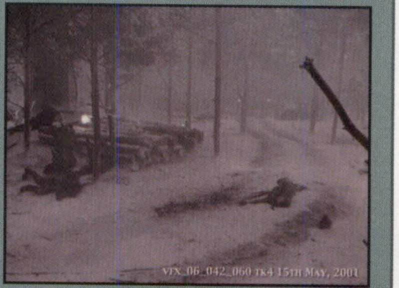
The brief was to put in a bank of cover smoke while the company of soldiers ran through it, and of course

The money shot

We called this 'the money shot' because of where it fits in the sequence. One of the soldiers is ambushed, and left wounded while his comrades attempt to get to him while under fire from two German machine gunners and a rifleman. A large fire fight takes place, and nearly all the shots are close-ups of the characters and specific action. The shot was taken from a high angle to give an overall view of the massive fire fight taking place between the two groups of soldiers. The second German machine gunner was never actually there on set, and his position, tracer fire, and muzzle flashes were invented for the sequence. The shot didn't have as much destruction and chaos as was required, so my job was to add to that. I added six extra ground hits, sending up plumes of snow and dirt using particle generators in *After Effects*. I also added numerous muzzle flashes to both the Germans and Americans, and added a huge amount of tracer fire, since there were three machine guns involved in the firefight. When the director and editor saw the additional elements, they liked them so much that I kept having to add more to the scene.



The addition of tracer fire, muzzle flashes and ground hits go a long way to making this a spectacular shot in action.



The editor and director identified this shot at an early stage for enhancement, though it wasn't planned for.

to remove the crew vehicles. We generated the smoke in *After Effects* and tracked it into place in *Commotion*, then graded it to match other shots in the sequence which showed real smoke. The vehicles were covered with a patch of greenery after being tracked largely by hand.

One-offs

Some of the more familiar shots, such as muzzle flashes, took very little time, however some shots were one-offs, often requested by the Director or the Editor of that episode. These took much longer than anticipated because they hadn't been planned beforehand as visual effects shots.

One such example was a scene in the POW camp. In the scene, Nixon (Ron Livingston) and another Easy Company commander are watching a couple of people looting bodies in the camp. One of the extras is picking up a prosthetic dummy, which looks very rubbery, while another extra lurks in the background – fine, except that the focus of attention should have been the woman in centre frame, since she'd made an appearance earlier in the episode relevant to the story.

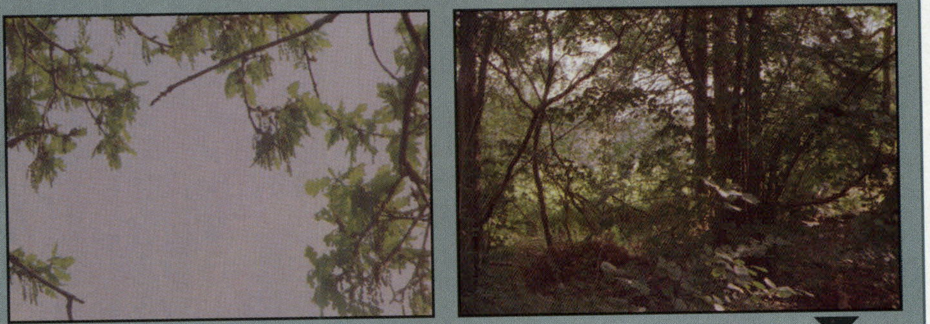
The depth of field and handheld camera movement made this a particularly tricky shot. We did some CG make-up enhancements to make the dead extras look a bit more dead which involved extensive painting and tracking to replace healthy faces with emaciated ones. We also removed the superfluous extra which was detracting from the main figure, and replaced the rubbery dummy extra with someone less conspicuous. There was smoke crossing the shot which also had to be replicated to make our digital alterations look convincing.

Despite the fact that we were working 12-hour days as well as the weekends towards the end, the system worked so well that it proved to be the best experience we've all had – it was just a very successful working environment. One exciting aspect of the system was the 'one shot, one person' principle employed in the production of nearly all of the in-house shots. Put simply, this meant that we'd often choose shots that we specifically wanted to do, and keep working on them until they were right, regardless of how tricky they were. Having this sort of individual input gave us an enormous amount of enthusiasm for what turned out to be a spectacularly successful piece of film making. The wine also helped. ca>s

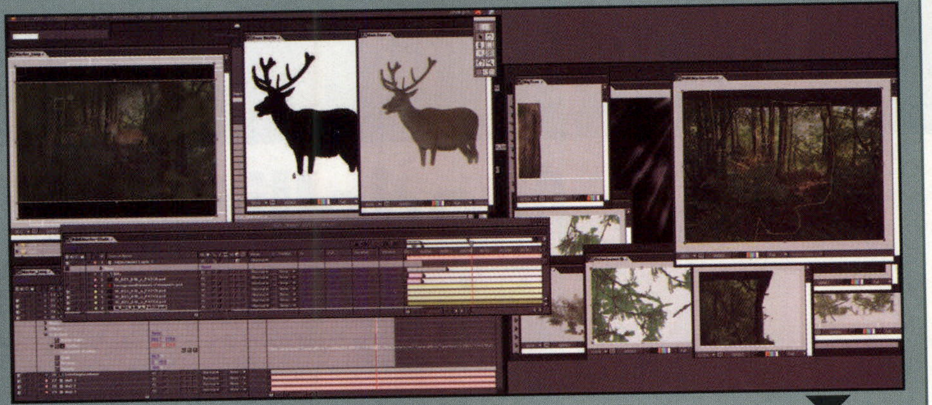
For more information on the making of *Band of Brothers*, go to [w] www.spielberg-dreamworks.com/bandofbrothers/

The Richmond Deer

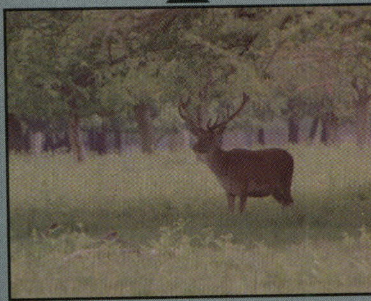
This shot ought to have been straightforward, but wasn't because we hadn't planned for it. In the scene, soldiers are treading carefully through the forest, when they encounter a deer – which wasn't there, well, it wasn't until I composited it into the scene. The background plates of forest hadn't been shot separately, so I had to generate a clearing and backgrounds from separate plates taken from earlier in the sequence, some of which also contained soldiers. The deer itself was shot on a hot mid-summer day in Richmond Park, with birds flying overhead and a heat haze. The deer had to be rotoscoped out using *Commotion* which we also used to paint out the birds. We compensated for the heat haze distortion in *After Effects*, and composited forest and foliage plates into the generated background and foreground effects. Extensive shadow maps and grading were applied to make the deer look as if it was really in the forest clearing.



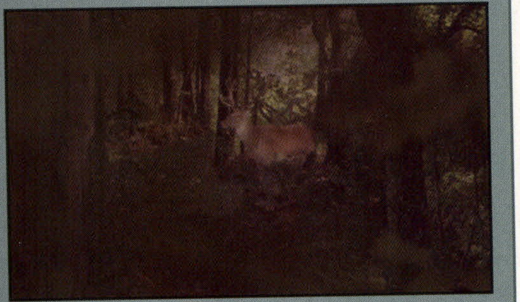
Trees, forest and foliage elements used in the final composite of the Deer shot.



There were many moving mattes, stills, forest footage and lighting maps used, as well as expressions.



The deer minding its own business in Richmond Park, shot on a long lens with flying birds and heat haze.



The final shot, of which there were three altogether. One also had the deer running out of the clearing.

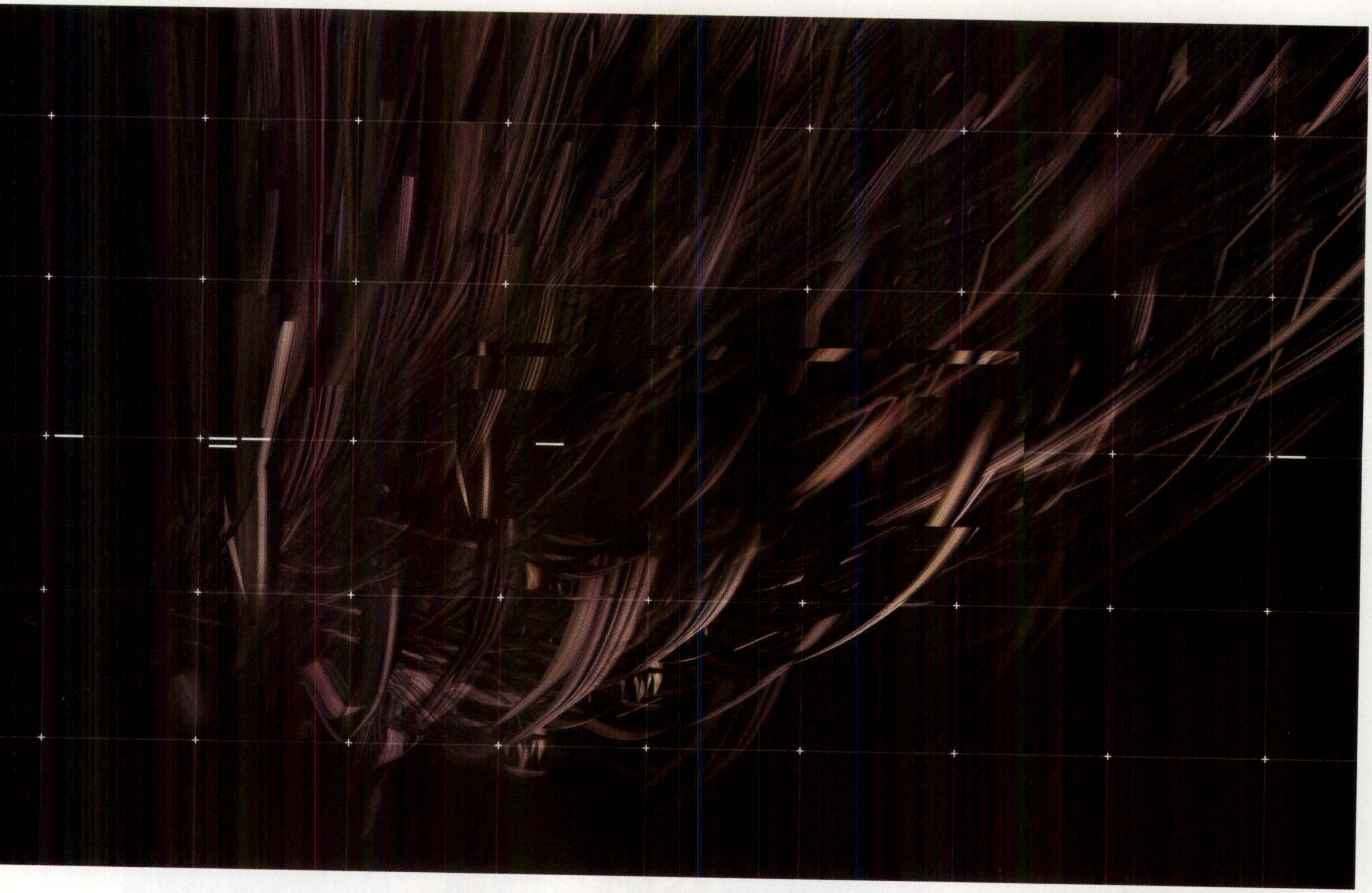


Illustration: Tom Muller **[w]** www.ximeralabs.com

Modelling hair using LightWave 7

Hair is one of the most difficult things to model in 3D but the cut-down version of *Sasquatch*, which comes with *LightWave 7*, enables you to create some convincing effects...

Expertise provided by Christian Darkin **[e]** christian@darkin.demon.co.uk.

LightWave 7 costs £1759 from NewTek **[w]** www.newtek.com **[t]** 020 7731 7930.

Demo on disc

The files for this tutorial are in the Tutorial\Hair folder on the CD. This tutorial is written for full versions of *LightWave 7* and *After Effects 5* but we've provided notes for using the demos on the CD.

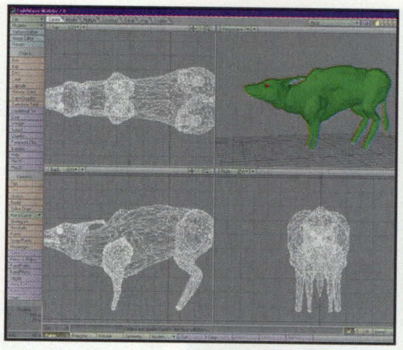
Traditionally, materials for 3D objects are created by taking images – textures, bump maps, reflection maps, and so on, and wrapping them around 3D objects. This works very well for most types of material. Metals, plastics, woods, and even skin textures work fine. However, things get a little more tricky when you come to hair.

While you might be able to get away with a traditional texture for short fur viewed at a great distance, close up, it just doesn't work. There's no substitute for being able to render the thousands of individual strands of hair that make up a furry object, and comb them into complex and interesting shapes.

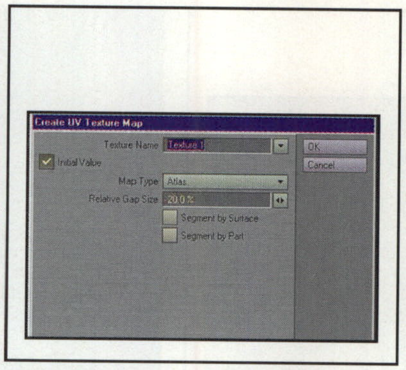
Most 3D packages don't come with hair as standard yet but *LightWave* is the exception. It comes with a cut-down version of *Sasquatch* – one of the most sophisticated hair plug-ins on the market.

Part 1: The creature

Here we're going to use *Sasquatch*, one of the most sophisticated hair plug-ins on the market, to create a furry creature, and composite it into a video scene



1 We begin with our creature. It's a strange beast, somewhere between a dog and a deer. It's been created already as a single mesh. Open Creature.lws on the CD. We haven't worried too much about smoothing the joins between the legs and body because the thickness of the fur will cover any small seams in the model.



Create UV Texture Map

Texture Name: Texture 1

☑ Initial Value

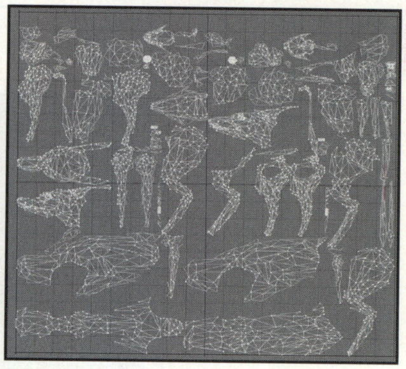
Map Type: Atlas

Relative Gap Size: 20.0 %

☐ Segment by Surface

☐ Segment by Part

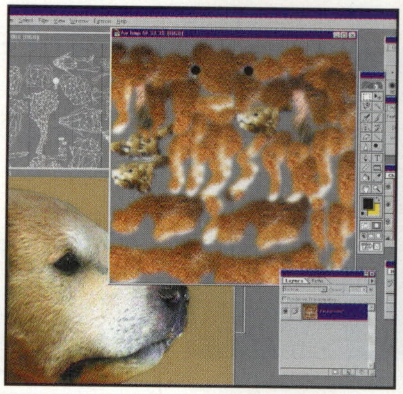
2 Fur isn't going to completely obscure the texture of the creature itself. In fact, in some places, like around the nose and eyes, there won't be any fur. Switch *LightWave's* Modeller into Texture mode (with the T button at the bottom-right of the screen) and create a new Atlas map.



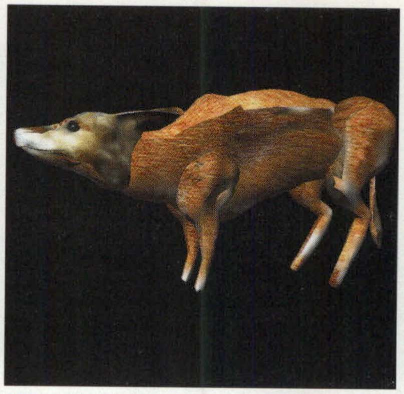
3 Switch one of the viewports to UV Texture mode, so you can see what you've done. *LightWave* has created a texture map, cutting the object into pieces, and arranging them on a flat image. Looking at the map, we can recognise the various slices of our creature.

On edge

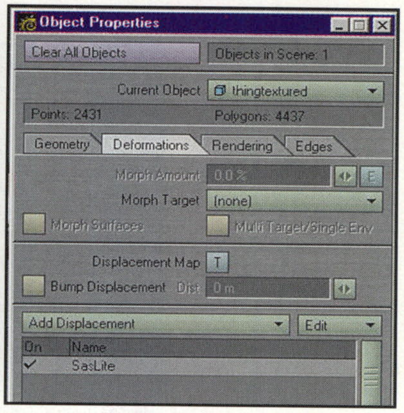
To get the edges right, try adding another layer, and painting onto it with the Opacity set to about 50 per cent. That way you can see the wireframe as you're painting.



4 Save this wireframe map as an image file, and import it into *Photoshop*. We'll import several fur images from which to construct our animal's pelt, and use the soft edged Clone tool to paint them over the wireframe. See fur.bmp on the cover CD.



5 Loading the new texture image into *LightWave*, you can use it as both a texture and a bump map for your creature. You can see that we haven't been too careful about blending the seams between different parts of the texture. This doesn't matter, because the fur will cover any lines.



Object Properties

Objects in Scene: 1

Current Object: thingtextured

Points: 2431

Polygons: 4437

Morph Amount: 0.0 %

Morph Target: (none)

☐ Morph Surfaces

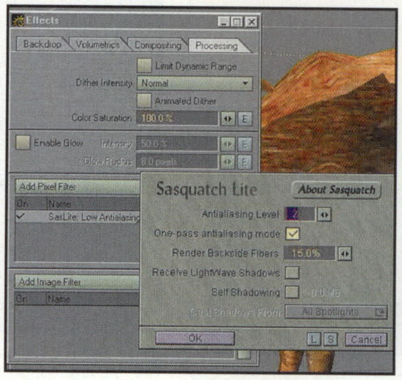
☐ Multi Target/Single Env

Displacement Map: T

☐ Bump Displacement Dist: 0 m

On	Name
✓	SasLite

6 The next step is to create the fur. Load up *LightWave's* layout program, and import your creature. Select it, and go to Item Properties, and use the Add Displacement button to add a *SasLite* displacement to the object.



Effects

☐ Limit Dynamic Range

Dither Intensity: Normal

☐ Animated Dither

Color Saturation: 100.0 %

☐ Enable Glow Intensity: 50.0 %

Glow Radius: 8.0 pixels

On	Name
✓	SasLite: Low Antialiasing

Sasquatch Lite

Antialiasing Level: 2

One-pass antialiasing mode: ☑

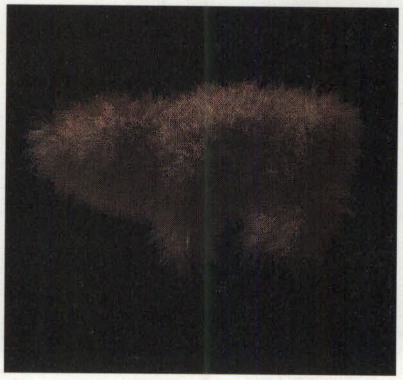
Render Backside Fibers: 15.0%

Receive LightWave Shadows: ☐

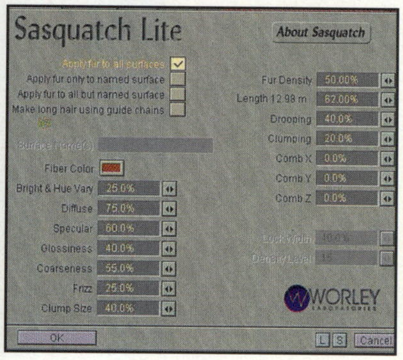
Self Shadowing: ☐

Cast Shadows From: All Spotlights

7 The fur is now in place, but before it will be rendered, we need to select the Effects/Image Processing panel, and add the *SasLite* Pixel Filter. This controls the anti-aliasing and Shadow settings for all the fur in your scene.



8 Once that's done, we produce a test render. The result is certainly hairy, but it's not very controlled. It's an explosion of fur, which looks as though it's just wandered out of the Ice Age. Not exactly what we're looking for.



Sasquatch Lite

Apply fur to all surfaces ☑

Apply fur only to named surface ☐

Apply fur to all but named surface ☐

Make long hair using guide chains ☐

Fiber Color: 🟥

Bright & Hue Vary: 25.0%

Diffuse: 75.0%

Specular: 60.0%

Glossiness: 40.0%

Coarseness: 55.0%

Frizz: 25.0%

Clump Size: 40.0%

Fur Density: 50.00%

Length 12.98 m: 62.00%

Drooping: 40.0%

Clumping: 20.0%

Comb X: 0.0%

Comb Y: 0.0%

Comb Z: 0.0%

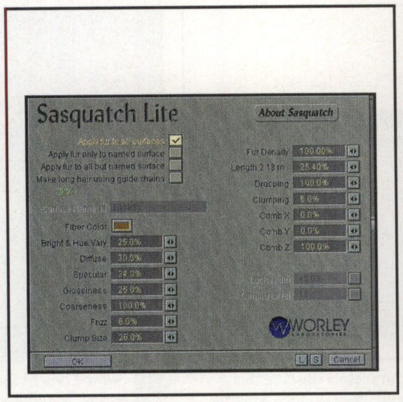
9 Going back to the Object Properties panel, double-click the *SasLite* listing to bring up the controls for the feature. *SasLite* is a cut-down version of *Sasquatch*. The full version contains more controls, and enables you to be much more specific about the sculpting and animation of your fur. ➤

Part 2: Adding variety

We've produced an even coat of hair all over the creature but it looks too uniform – the next stage is to vary the length, thickness, colour and so on

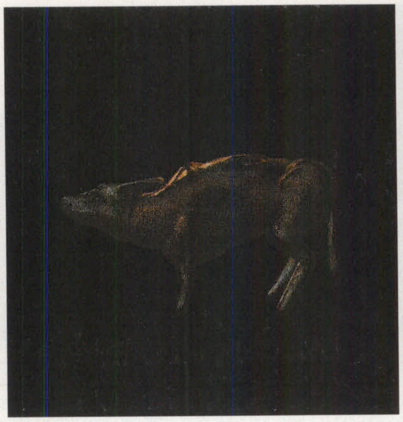
Quick renders

Increasing the hair density also increases the render time, as does adding more lights. Turn off the instances of *SasLite* you're not working on so your test renders are quicker.

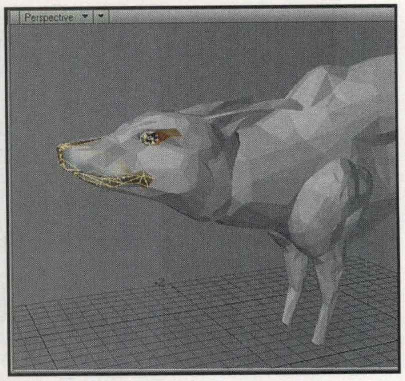


Apply fur to all surfaces ☑
Apply fur only to named surface ☐
Apply fur to all but named surface ☐
Make long hair using guide chains ☐
Fiber Color
Bright & Hue Vary 25.0%
Diffuse 30.0%
Specular 24.0%
Glossiness 25.0%
Coarseness 100.0%
Frizz 8.0%
Clump Size 26.0%
Fur Density 100.00%
Length 2.13 m 25.40%
Drooping 100.0%
Clumping 6.0%
Comb X 0.0%
Comb Y 0.0%
Comb Z 100.0%

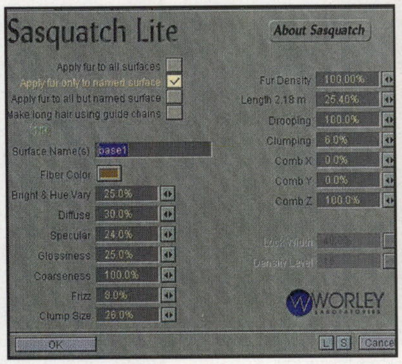
1 We need the fur much shorter, so reduce the length to 25. Also lighten its colour, and increase the drooping so that it hangs down a little. In addition, because short hair appears to be much thinner, increase the Fur Density and the Coarseness right up to 100 per cent.



2 This produces an even coat of hair all over the creature. It's about the right length, but it doesn't look right. No creature has hair which is completely even. We need to be a bit more specific about the way the hair is controlled.

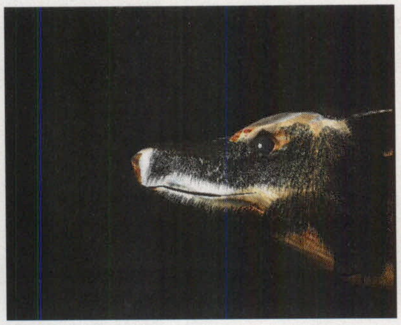


3 We need to define some areas which are completely hairless. Switch back to the Modeller, and, in Polygon mode, select everything except the eyes, nose and an area around the creature's mouth. Name this surface 'base', then re-apply the texture material to this surface so the creature's skin is restored.

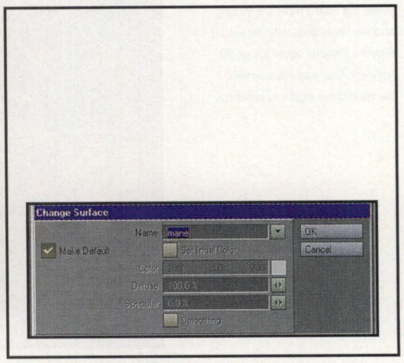


Apply fur to all surfaces ☐
Apply fur only to named surface ☑
Apply fur to all but named surface ☐
Make long hair using guide chains ☐
Surface Name(s) base1
Fiber Color
Bright & Hue Vary 25.0%
Diffuse 30.0%
Specular 24.0%
Glossiness 25.0%
Coarseness 100.0%
Frizz 8.0%
Clump Size 26.0%
Fur Density 100.00%
Length 2.18 m 25.40%
Drooping 100.0%
Clumping 6.0%
Comb X 0.0%
Comb Y 0.0%
Comb Z 100.0%

4 Back in Layout, select the *SasLite* displacement again. Check the 'apply fur only to named surface' button, and type the new surface name (base) into the Surface Name box.



5 Now, when we render, you'll find the hair only covers those areas where it should be. There isn't any hair on the eyes, nose or mouth. However, the creature is still very uniform. We need to create some areas of hair with different colours and lengths.

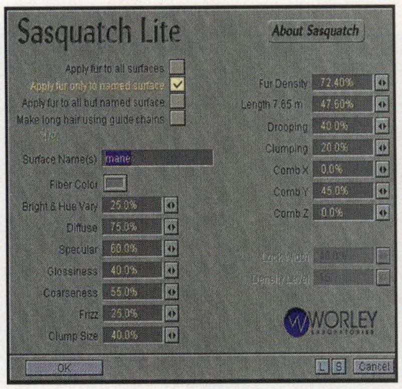


Name mane
Make Default ☑
Set Initial Color ☐
Smoothing ☐

6 Switching back to the Modeller, select just the polygons on the top of the creature's head, and the back of its neck. Now bring up the surface panel, and call this part of the creature 'mane'.

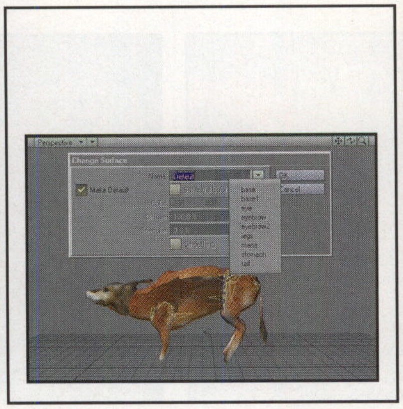
Hair effects

We could use the Long-hair setting for this, and produce guides, to describe the way the hair is combed. However, this tends to involve a lot of work, and is best used for flowing hair, or ropes like ponytails.

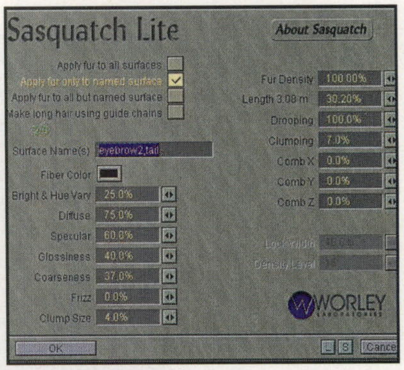


Apply fur to all surfaces ☐
Apply fur only to named surface ☑
Apply fur to all but named surface ☐
Make long hair using guide chains ☐
Surface Name(s) mane
Fiber Color
Bright & Hue Vary 25.0%
Diffuse 75.0%
Specular 60.0%
Glossiness 40.0%
Coarseness 55.0%
Frizz 25.0%
Clump Size 40.0%
Fur Density 72.40%
Length 7.85 m 47.60%
Drooping 40.0%
Clumping 20.0%
Comb X 0.0%
Comb Y 45.0%
Comb Z 0.0%

7 Return to the Layout program, and add another instance of the *SasLite* Displacement. This time, give it a light grey colour, and make the hair much longer. Again, check the 'apply fur only to named surface' box, and specify the mane as the hair area.



8 Now the creature has a shock of grey hair on the top of its head. Going back to the Modeller, create surface selections for the eyebrows and ear tips, the stomach and throat, the top of the creature's legs, and its tail.



Apply fur to all surfaces ☐
Apply fur only to named surface ☑
Apply fur to all but named surface ☐
Make long hair using guide chains ☐
Surface Name(s) eyebrow2,tail
Fiber Color
Bright & Hue Vary 25.0%
Diffuse 75.0%
Specular 60.0%
Glossiness 40.0%
Coarseness 37.0%
Frizz 0.0%
Clump Size 4.0%
Fur Density 100.00%
Length 3.08 m 30.20%
Drooping 100.0%
Clumping 7.0%
Comb X 0.0%
Comb Y 0.0%
Comb Z 0.0%

9 Create hair for each of these parts, giving it varying lengths, colours and thicknesses until you're happy with the general effect. The Surface Name box enables us to input multiple surface selections using either commas or wild cards (for example, 'hair' applies hair to every surface whose name ends with the word hair).

Part 3: Compositing

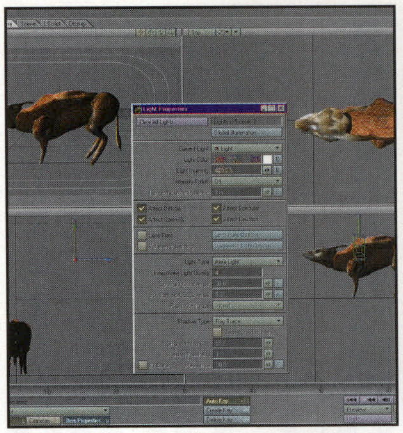
Now we're going to animate the beast and composite it into a natural-looking habitat using *After Effects*

Casting shadows

In the *SasLite* Pixel filter you can set the hair strands to cast shadows. This adds realism, but also increases render time.

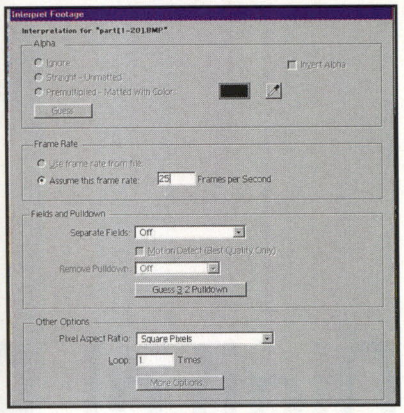
Working with demos

Because of space limitations on our cover CD, we've rendered the animation as two QuickTime files: creature.mov and creaturematte.mov. You'll need to use these when you hit step 3 on this page, if you're following the tutorial using the demos of *LightWave* and *After Effects* rather than the full versions. Place them both on the *After Effects* Timeline with the matte file at the top. Us the Switch Modes button at the bottom of the Timeline and then select the matte file as a luma-matte of the creature.mov to make its background transparent.



1 Once you're happy with the fur, you can go on to improve its lighting. Here we've used a Back light and a Fill light (both Area lights) to lift the scene. The rendering time for the image increases significantly for each extra light you add.

2 With all the rendering options like Anti-aliasing and Radiosity turned on, our creature begins to look pretty good. We now need to composite it into a video scene. We could do this within *LightWave*, but for more control, we'll use *After Effects*.



Interpret Footage

Interpretation for "part[1-20].BMP"

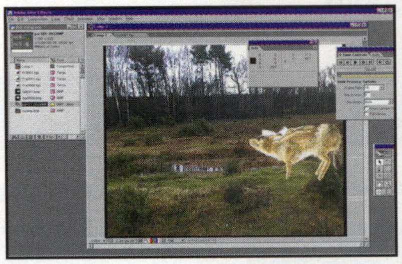
Alpha
○ Ignore
○ Straight - Unmatted
○ Premultiplied - Matted With Color:
☐ Invert Alpha

Frame Rate
○ Use frame rate from file:
● Assume this frame rate: 25 Frames per Second

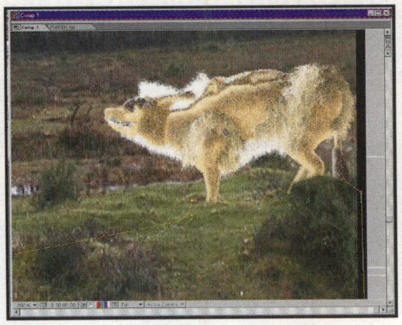
Fields and Pulldown
Separate Fields: Off
☐ Motion Detect (Best Quality Only)
Remove Pulldown: Off

Other Options
Pixel Aspect Ratio: Square Pixels
Loop: 1 Times

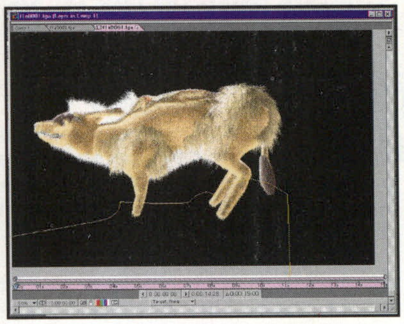
3 Render your animation as a series of still Targa files, then import them (fur.lws on the CD) into *After Effects* with the Sequence box checked. All you need to do is select the first image, and the sequence will be loaded in. Use File/Interpret Footage/Main to select the correct frame rate.



4 Create a new composition, and import your video footage as the background, swamp.bmp on the CD. We now add our creatures. Ordinarily, compositing a fury creature would be a real job. All the fine edges, and transparency would be a real problem for any chromakey package. However, because we've exported our file as a Targa sequence, the Alpha channel has been created for us, and we can just drag and drop!



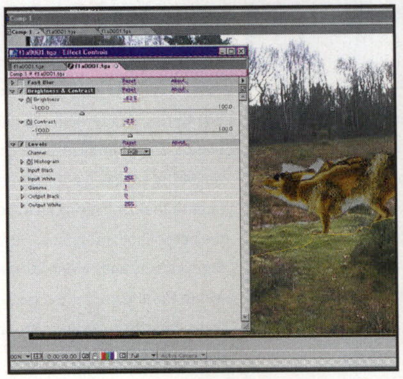
5 Right now, the creature looks pretty poor, it's been placed over the picture, but not integrated into it. Our first job is to draw a mask to make parts of the model (for example, the feet, which we haven't modelled) appear to go behind the grass.



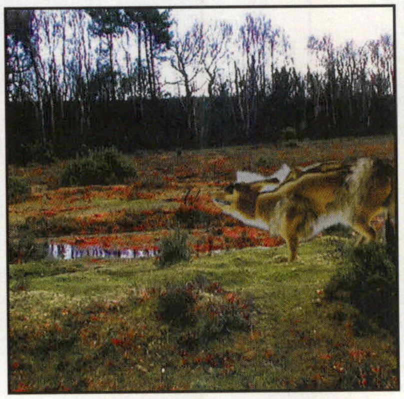
6 It's easy to draw a mask directly onto the composition with the Pen tool, then invert and feather it so the edges aren't too sharp. Because we're not moving the image itself, the creature can move in whatever way we want within the frame, and the illusion will be preserved.

Colour correction

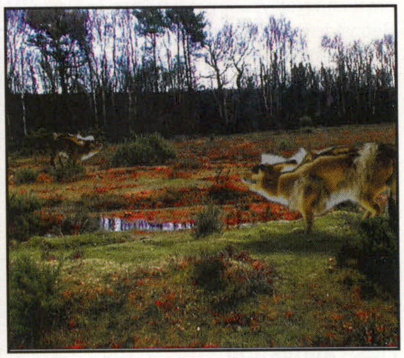
Colour correction is always tricky. If we'd loaded our backdrop into *LightWave*, we could have got the lighting right from the start.



7 Our next job is to balance the creature's colour and brightness with the video shot. We've over-lit our model, so we need to take the brightness down and reduce the colour saturation as well (which is almost always higher in CG shots than video images).



8 At this point we'll alter the background shot, darkening it, and making the colours a little richer until the creature fits in seamlessly. In addition, blur the creature slightly, blending it a little better with its surroundings.



9 The final step is to produce a copy of the creature layer – use the Levels and Blur filters to reduce it to a black smudge, flip it over, and place it on the ground underneath the previous layer so that it forms a shadow. Once another creature is added (a copy of the same animation offset in time), the entire shot becomes quite convincing. ca•s

Virtual popstress TMmy is one of DAG's most popular creations. Originally designed to show the potential of virtual characters, she has appeared in her own pop video, presented TV programmes, modelled clothes for New Look and, thanks to clever database technology, works as an interactive 'virtual assistant'.

Digital Animations Group

From disembodied heads to virtual pop stars, DAG is doing amazing things with animation. *"We put flesh on the bones,"* says Creative Director Mike Antliff

Tucked away in the corner of a Scottish industrial estate, the offices of Digital Animations Group are utterly faceless, which is ironic, because faces are what DAG does best. From the digital newsreader Ananova to a hyperactive Shakespeare for BBC2, DAG is working on the hardest special effect of all: realism.

The results are extraordinary. The Head, a disembodied presenter who has interviewed Britney Spears for Channel 4, makes Max Headroom look like a Canadian actor with bits of foam glued to his head, while clever technology enabled the two-man Shakespeare team to create 12 minutes of broadcast-quality animation in less than a week. Other characters include virtual pop star TMmy – currently modelling clothes for teen boutique New Look and presenting television programmes on Cable TV, and Seonaid, who will be the friendly face of the Scottish Parliament's information kiosks and online services.

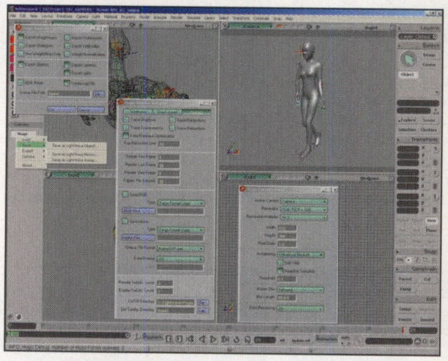
As Creative Director and DAG co-founder Mike Antliff explains, the inspiration is different for each character. "TMmy was an original concept conceived to promote virtual characters, Ananova was a collaboration, and we also work with established brands such as Churchill. With Seonaid, we collaborated with the people at the Scottish Parliament who gave us an idea of the character – we then put flesh on the bones."

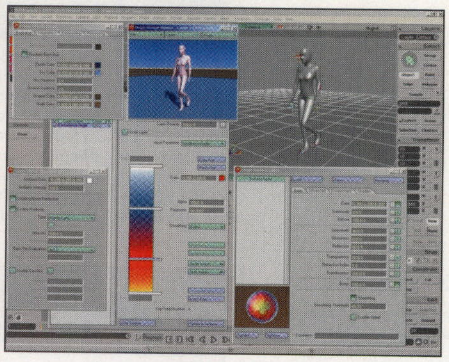
Flesh animation

The character of Seonaid was fleshed out in various ways. *Photoshop* was used for high-resolution character designs, which will also be used for printed publicity materials, and these designs were then turned into 3D models by DAG's team of modellers ➤

Hugo a go-go

Frustrated by the existing software, DAG developed its own: *Hugo*

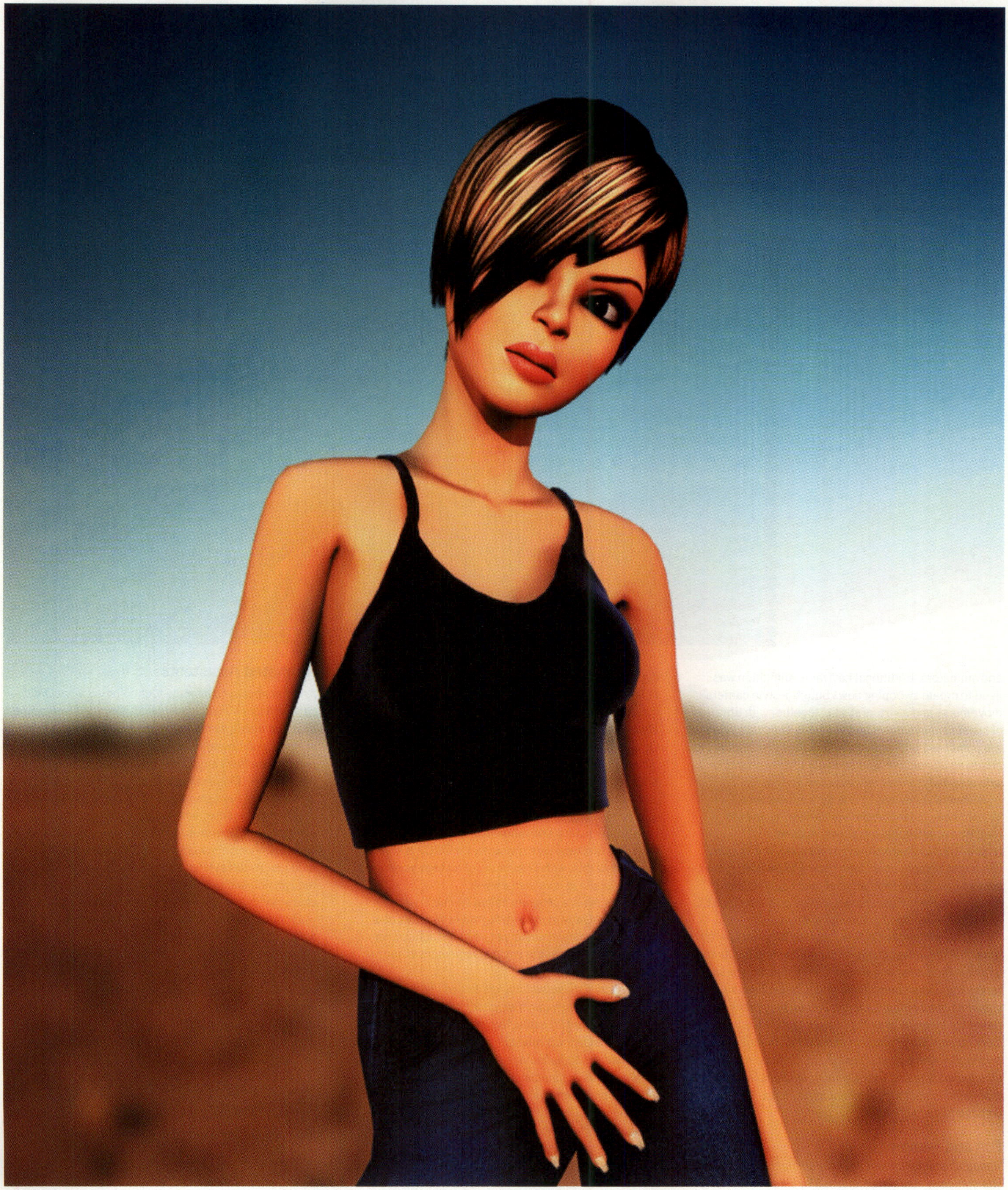




Hugo is designed to transfer objects from *LightWave 3D* into *Softimage|XSI*, and vice versa, so for example you can create a scene in *Softimage* and then save it in *LightWave* format. Many parameters, such as light settings, are taken directly from *Softimage|XSI*, and by setting these parameters in *Hugo*, the user can export a scene and add it directly to a render farm running *LightWave 3D*.

By offering an alternative to the *mental ray* rendering engine, *Hugo* can save users a fortune (unlike the *Softimage* rendering engine, *LightWave* doesn't charge a per-processor license fee). Delivering an integrated tool set that combines the best of both programs, *Hugo* means that features such as fog, radiosity and compositing are more accessible from within *Softimage*, and the built-in Surface Editor means that users can edit surfaces in the same way they would have done in *LightWave*.

Although developed for in-house use, DAG is preparing a free public beta of *Hugo* for other artists to use and a retail version will be developed soon afterwards.



1. Although DAG is excited about the combination of animation and interactivity, traditional keyframe animation is still one of its strengths. The company regularly creates FMV sequences for games or commercials such as Winston here, for Churchill Insurance.

and animators. Traditional keyframe animation was used to create swooping news bulletin-style camera movements and a virtual studio, together with libraries of realistic movements and gestures. These libraries are combined with artificial intelligence technology to create an interactive, and spookily lifelike character who responds to user requests and actions.

As Antliff notes, the character's appearance, 'doesn't have to be completely lifelike,' to appear real. Because Seonaid is superimposed on a high-resolution background and moves and speaks like a real person, users aren't going to be poring over every pixel. The combination of technologies also means that the virtual character runs on a standard PC with an off-the-shelf graphics card.

That doesn't mean DAG is a low-tech operation: far from it. With workstations running Windows 2000 and a render farm boasting some 70 Windows NT-based rendering nodes (both single and dual processor systems), the company can call on serious processing power for its creations. *Photoshop*, *LightWave* and *Softimage|XSI* are used for illustration, modelling and animation, while *Digital Fusion* and *ProTools* take care of video editing and sound editing respectively. DAG also uses its own software including *Hugo*, (see panel on page 56).

Fun and games

Virtual characters aren't the only string to DAG's bow. The company was commissioned by Electronic Arts to digitally recreate Pierce Brosnan for the *James Bond 007* racing game, and other commissions have included FMV sequences for Eidos Interactive's *Braveheart* and Core Design's *Fighting Force* games. On our CD you'll find some of DAG's showcase footage, including pop videos, an animated Audi TT and a breathtaking sequence showing Eurofighter in action.

By combining this animation expertise with its own proprietary software, DAG can generate broadcast-quality animation in a very short period of time. The Shakespeare character for BBC2 is a good example of this, with 12 minutes of footage generated by two people in less than a week.

The secret is a program called *Mimic 2*, which enables DAG's animators to highlight sections of a voiceover track and select pre-defined actions, for example frowns, laughs or other expressions, for the visuals.

As each of these actions has already been saved as a library item, they can then be triggered by the *Mimic* software. As Antliff notes, "it renders almost in real time" – at broadcast quality – and if the client changes his or her mind, the footage can be edited and regenerated very quickly without having to render the entire clip all over again. The same technology will play a key role in the forthcoming children's TV programme *Internutz*, which features a number of computer-generated cartoon characters, all created and animated by DAG. "It's the effects tool of the future," Antliff enthuses.

Animated Assistants

Another application for the technology is what DAG calls VIAs, or Virtual Intelligent Agents. VIAs combine artificial intelligence, voice and facial recognition and animation to create what Antliff describes as "an experience that's enjoyable, engaging and informative." One example of this technology in action is the Virtual Receptionist, a multilingual VIA based on the TMmy character, who greets visitors, arranges meetings and operates the telephone. Although the virtual receptionist works from text input at the moment, Antliff is keen to incorporate voice recognition and even facial recognition to create a character that recognises you and reacts accordingly.

By creating animation libraries and combining them with text or voice data, it's a painless process to repackage a virtual character for a different language, or for a different industry. It's an area Antliff is keen to explore. "It's extremely easy for us to adapt our characters to become virtual bank tellers, or tourist guides. Our biggest challenge is that the technology goes across all markets and geographical territories," he laughs. "It's a good problem to have." ca▸s

You'll find a sample of DAG's footage, including pop videos and the Eurofighter sequence on the cover CD in the Movies section.

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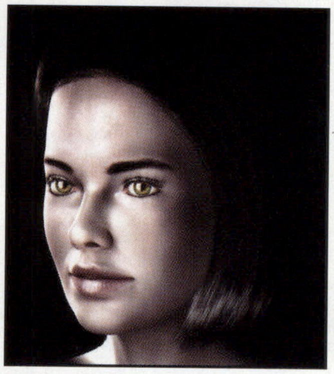
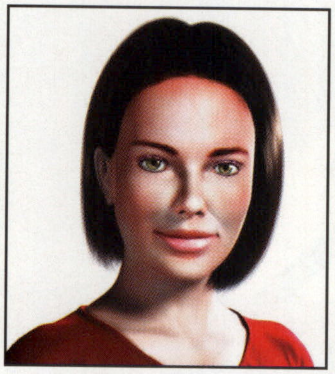
Virtually the real thing

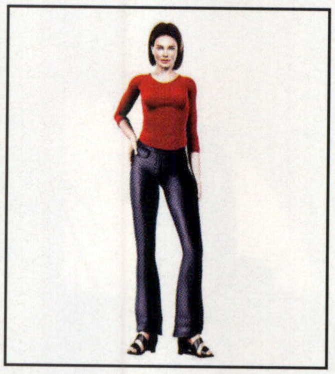
Seonaid is the friendly face of the Scottish Parliament's information kiosks and online services



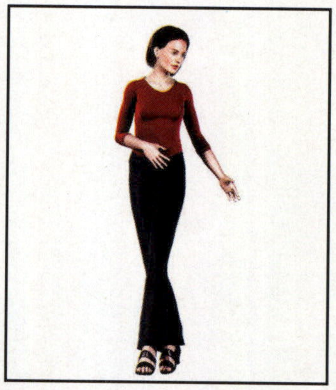
1 Seonaid (pronounced 'Shona') is DAG's latest virtual character, and will be the face of the Scottish Parliament's information kiosks and other electronic initiatives. After discussions with the clients about the kind of character they wanted, DAG's *Photoshop* experts got to work.



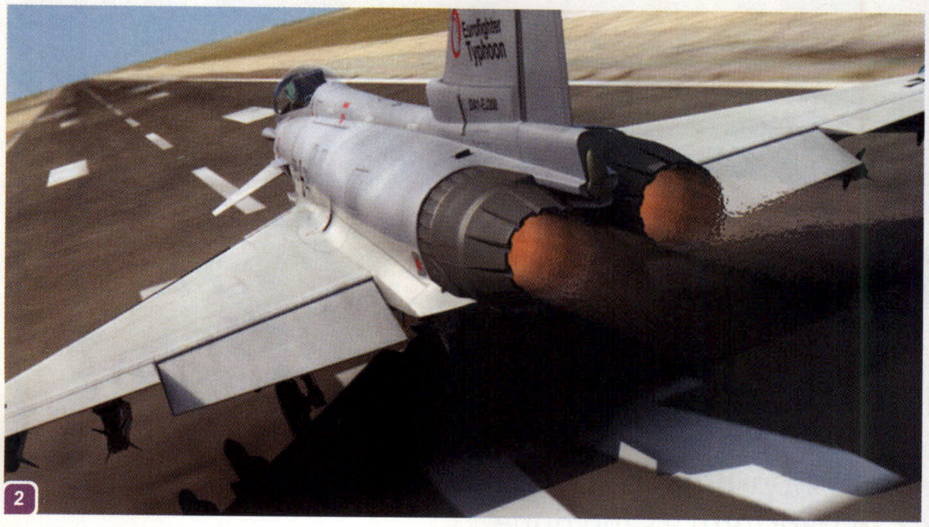
2 The high-res *Photoshop* images are used for print media and static shots, but the next step is to create a fully rendered 3D model from the detailed sketches. This model is then rendered using keyframe animation to create cut scenes that don't require interactivity.



3 This lower-resolution version of Seonaid is more suitable for the demands of a fully interactive system such as an information kiosk. Although the majority of Seonaid's appearances will be head and shoulders only, full models are created to cover every eventuality.



4 The models of Seonaid are rendered in a variety of poses to cover common gestures and movements, and these different poses become libraries that are combined with artificial intelligence software to create a character that looks, acts and moves like a real person.



2. This detailed image of the Eurofighter would be impressive enough as a static picture, but it's part of a fully-rendered video sequence that shows the new fighter jet in photo-realistic action.

3. The animation process combines very detailed 3D modelling with the texturing and lighting features of *LightWave*'s rendering engine, which adds motion blurring and lighting effects to the original model.

4. By combining the strengths of *Softimage|XSI* and *LightWave* via its proprietary *Hugo* software, DAG can swap data between the two apps before rendering the finished result, using *LightWave*'s rendering engine, on its massive rendering farm.

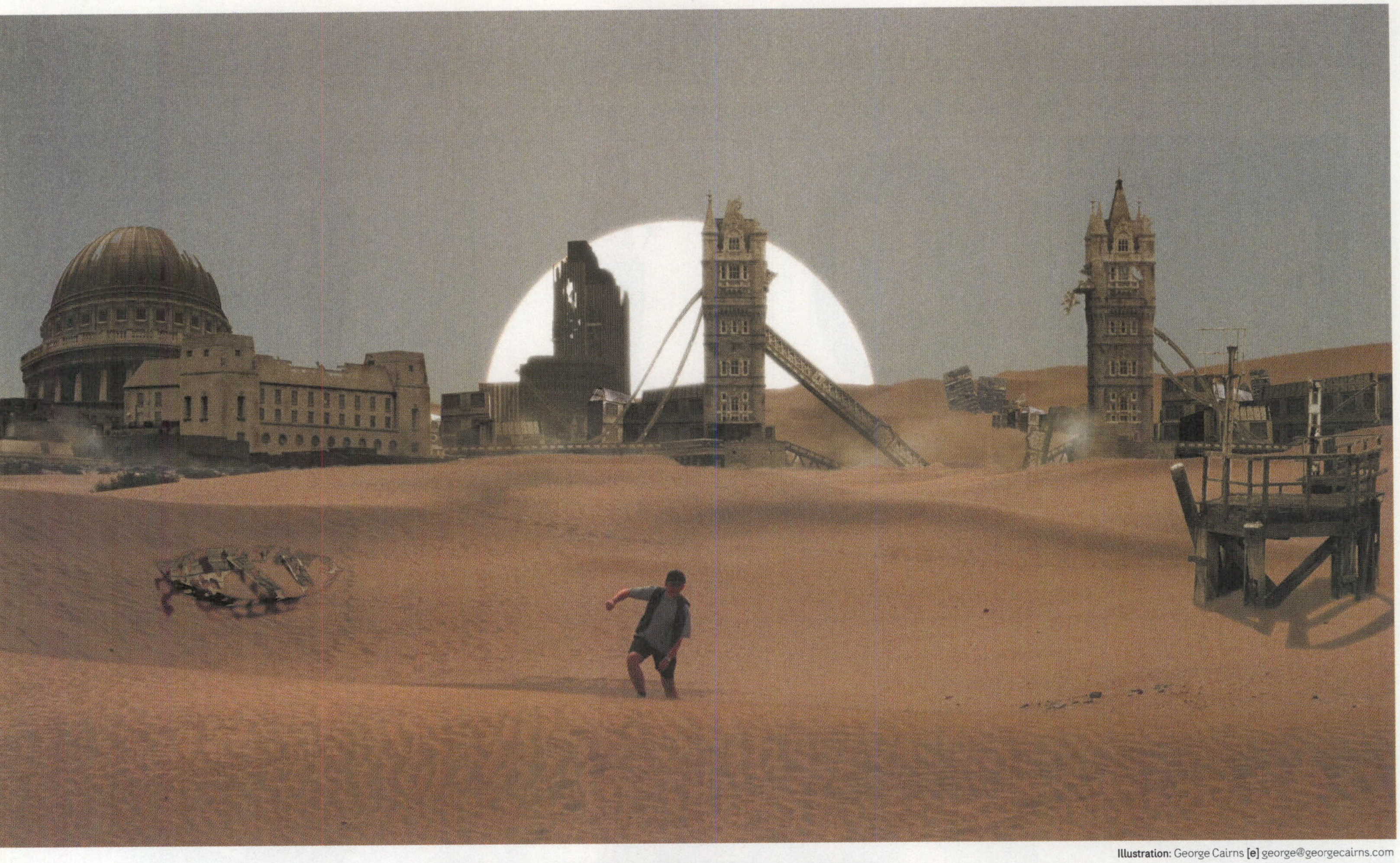


Illustration: George Cairns [e] george@georgecairns.com

Digital matte painting in Photoshop

Thanks to a *Photoshop*-produced matte painting, we can transform a sand dune location shot into a drought-stricken London

Matte painting is one of the oldest forms of movie special effect. Film makers soon realised it was easier and cheaper to paint the Himalayas into a scene than it was to lug a camera and crew on location there. As well as fighting budgetary constraints, the matte painter could add the unfilmable to the screen – a prehistoric jungle for example. Indeed the work of many great matte artists has gone unrecognised because it has been taken for reality by the cinema-going audience. Originally the matte painting was done on a sheet of glass and placed between camera and actor. Then matte paintings were added to the film through optical processing. In these digital days you can create one using *Photoshop* and add it to the film in post production. *Photoshop* is an ideal tool for creating a matte painting because photographic source images can be manipulated to alter reality. So let's create a matte painting of a derelict London overcome by deserts caused by an ecological disaster. We'll add this to a foreground image shot on location.

Files on disc

All the source files you need are on the Cover CD in the Tutorial\Matte folder.

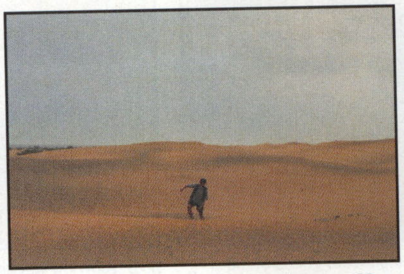
Tutorial by George Cairns
[e] george@georgecairns.com
[w] www.georgecairns.com

Part 1: Setting up a foreground reference image

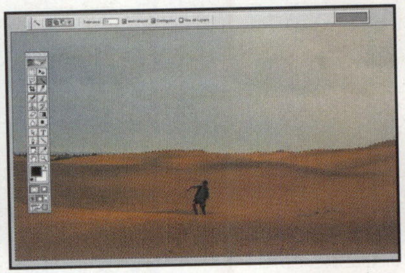
The first step is to position a foreground image to align the matte elements with, using ForegroundPlate.psd on the cover CD

Locked off camera

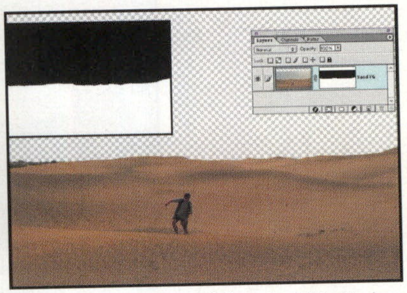
If you're going to create a painting to add to a moving image, then the source footage should be filmed with a locked off camera. This makes it easier to composite the matte without a noticeable wobble between the two elements. You can always fake a slight camera move by making the matte bigger than screen resolution then panning digitally across the composite in post production.



1 Open ForegroundPlate.psd on the cover CD. This is a screenshot of footage that we can add our *Photoshop*-produced matte painting to. You're going to use it as a reference layer so that you can align the finished matte painting with video footage using compositing packages like *flame* and Avid *Media Illusion*.



2 You'll need to hide the foreground layer's sky so that you can see where your background matte painting elements need to go. Use the Magic Wand tool (W) on a tolerance of 33 to select the sky. Shift-click if necessary to add all of the sky to the selection. Go to Select>Inverse. The ground is now selected.



3 In the Layer palette, click on the Add a Mask icon. This creates a black and white mask alongside the layer thumbnail. Areas of black on the Layer mask cause the corresponding sections of the layer to become transparent. White areas on the mask cause those parts of the layer to remain solid.

Part 2: London Bridge is falling down

The next stage in simulating a derelict far future city look, is to mask and transform various parts of the bridge

Hide and seek

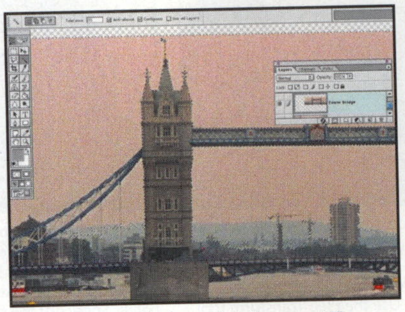
You could delete unwanted areas instead of hiding them with a mask. However the advantage of using a mask is that you can restore information on the layer. This means you can fine-tune what is shown or hidden until you're happy. Nothing is permanently deleted.

On target

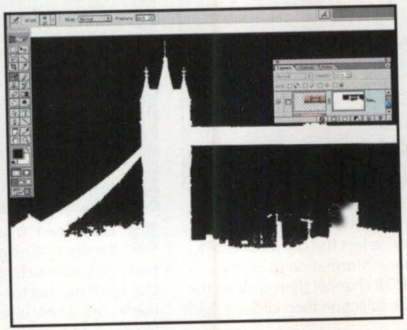
When using a tool, get a more accurate selection by pressing Caps Lock. This will give you a useful crosshair instead of the usual Tool icon.

Folders

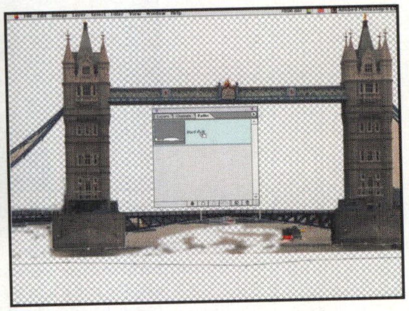
To streamline your workflow, use the Layers palette to create a coloured folder for your bridge layers. You can collapse the folder to make it easier to navigate round the other layers of the project.



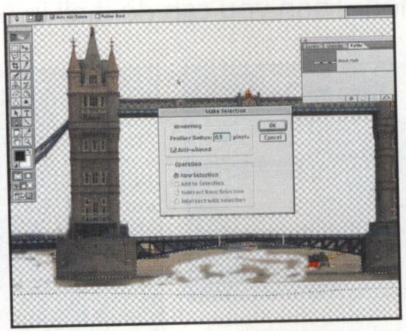
1 Open Towerbridge.psd on the cover CD. Select the sky with the Magic Wand (W). Shift-select as much as you can. There's a lot of unwanted detail to hide to isolate the bridge from its surroundings. Once you've made a rough selection, inverse it and click on the Add A Mask icon. Much of the background will disappear.



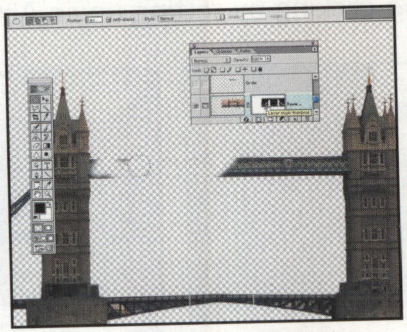
2 Click on the bridge's layer mask. Use a black airbrush on the mask to paint out the unwanted buildings. Be careful when spraying near the edges of the bridge. (If you do accidentally erase anything, switch the foreground colour to white and spray the hidden detail back in.)



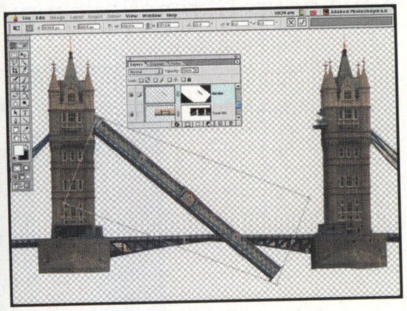
3 Select the curved area under the bridge by using the Pen tool (P) to draw a path. Draw a curve with the Pen tool by click-dragging between two points. In this way you can make long curved selections with the minimum of points along the path. Once you've drawn your path, go to the Paths palette.



4 In the Paths palette, make an anti-aliased selection feathered by 0.5 pixels. Click OK. Click back on the Layer mask thumbnail and fill this selection with black. The area you selected using the Path tool now becomes transparent. Use the Path tool to select and hide all non-bridge sections.



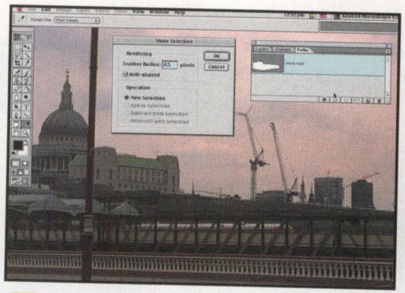
5 Select and copy the high level footbridge between the two towers and paste it onto a new layer. Hide that layer for the moment. Airbrush out the original footbridge on the bridge layer using the layer's mask. Spray back in some jagged edges with a smaller white brush.



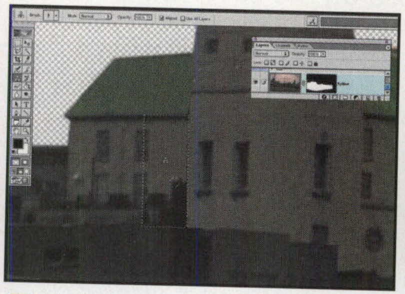
6 On the copied footbridge layer, choose Edit>Free Transform. Move the central pivot point to the top-left of the selection. Rotate the footbridge round the pivot point by click-dragging outside the Transform box. Isolate and manipulate the lower bridge and the cables using the same techniques as for the footbridge. ➤

Part 3: Send in the clones

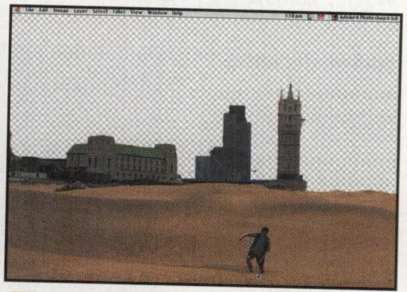
Remove unwanted items in the image by cloning adjacent pixels to hide them



1 Open Skyline.psd on the cover CD. Use the Path tool and a layer mask to hide the partially obscured St Paul's Dome, most of the buildings, the cranes and the sky. (We'll add a better dome from another source image.) Keep the Natwest Tower though – we'll need that later.



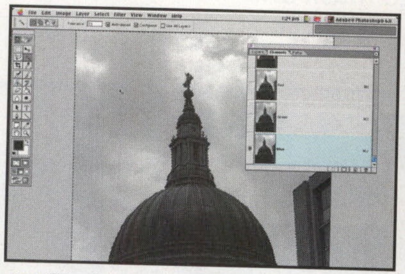
2 Use the Clone Stamp tool to get rid of the lamppost in the foreground. This powerful tool sucks up pixels from a selected area (Click+Option to choose the area) and sprays them wherever you choose. Draw rectangles with the Marquee tool (M) to limit the areas you are cloning into.



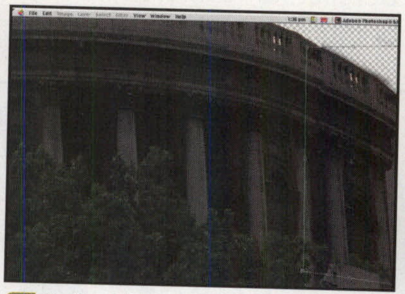
3 Show the foreground shot to see how much of the skyline layer you'll to need to work on. Copy the Natwest Tower. Paste it into its own layer then mask it out on its original layer. Move the tower to the left of the image. It may not be accurate geography but it's better composition.

Part 4: Patching up St Paul's

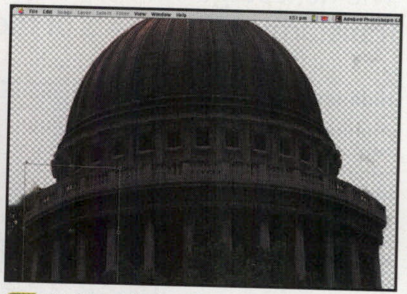
Why clone when you can copy and paste the pixels you need?



1 Open Dome.psd on the cover CD. In the Channel palette, select the Blue Channel. This lets the Magic Wand (W) select the sky more easily because there's less colour information to worry about. Go back to the RGB channel then click on the Layers palette. Invert the selection then click on Add A Mask to hide the sky.



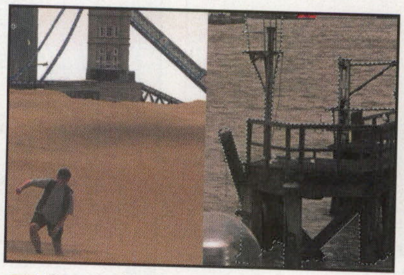
2 You'll need to reconstruct obscured sections of the dome. The curved shape makes cloning tricky so create patches from existing pixels instead. Use the Path tool to select some pillars and paste them onto a new layer. Use the Free Transform tool to scale and skew the patch till it fits.



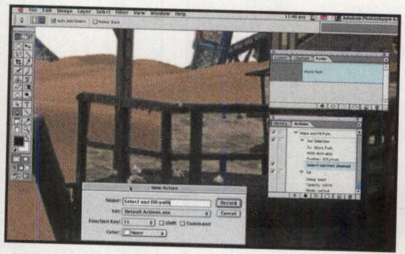
3 Patch over the trees at the left of the image by copying the reconstructed pillars at the right of the dome. On a new layer go to Edit>Transform> Flip Horizontal. Fine-tune the position of this new patch. Spray out the trees on the original layer by using the layer mask.

Part 5: Action stations

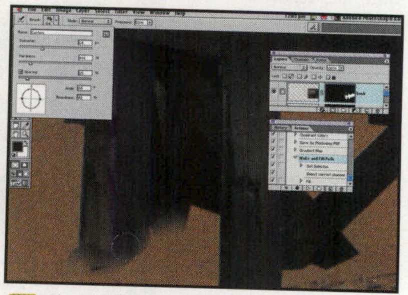
Save hours of repetitive mouse-clicking by setting up an Action. Then you can do it all in one keystroke



1 Open Dock.psd on the cover CD and crop the image to isolate the dock. Use the Paths tool to select an outline round the edge of the wooden structure. On the Paths palette choose Make Selection. In the Layers palette, click Add A Mask. Everything outside the selected area will vanish.



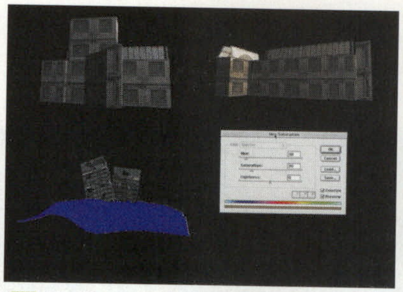
2 Draw a path. Open Window>Show Actions. Click on the Create New Action icon and assign it to F1. Click on Record. Go to the Paths palette and Make Selection. Go to the layer mask and fill the selection with black. Click Stop Recording. When you've selected a new path, press F1 and it'll do everything you recorded.



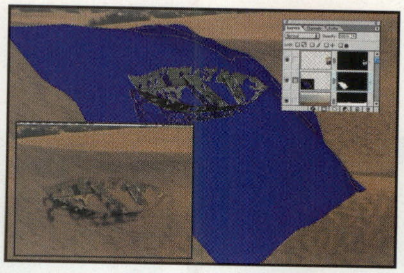
3 Clone in the missing left legs to hide the glass lamp. Spray a soft black airbrush on the dock's layer mask to make the bottom of the legs fade out as if blending into the sand. Clone out any seagulls – there's no place for them in this environment!

Part 6: A sprinkling of 3D

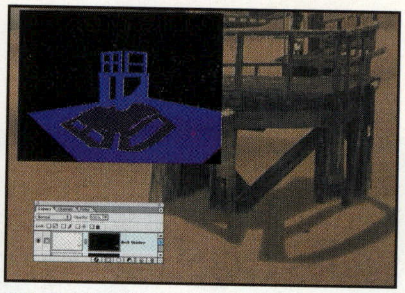
Some pre-rendered 3D elements help sell the effect of a derelict city



1 Use 3D rendered elements (Buildings01.psd, 02.psd, 03.psd on the cover CD) to augment the matte painting. To give them a sandy weather beaten look, go to Image>Adjust>Hue/Saturation> Colorize. Save the settings you use and apply the same treatment to the 2D photographic buildings.



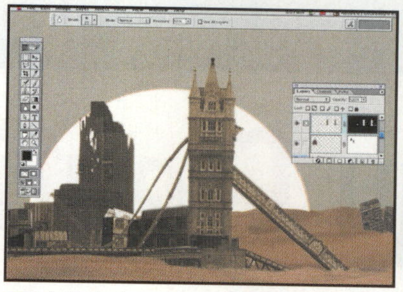
2 Position the rotten rowing boat (boat.psd on the cover CD) in the foreground. Use the Magic Wand to select the blue plane representing the sand. Fill the selection on the layer mask with black to make it disappear. Select the darker blue shadows. Turn them to a darker brown using the Colorize option.



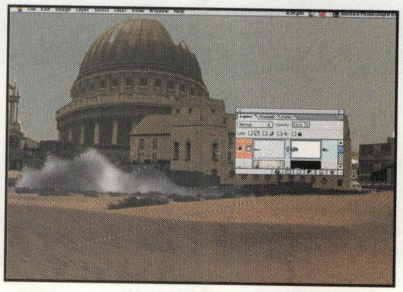
3 Open DockShadow.psd on the cover CD. Use the Magic Wand tool to select the shadow cast by some basic 3D shapes. Paste this onto a layer behind the dock. Colorize it and add some noise to give it a sandy texture (Filter>Noise>Add Noise). Tidy it up by painting bits out using the layer mask.

Part 7: Rough it up

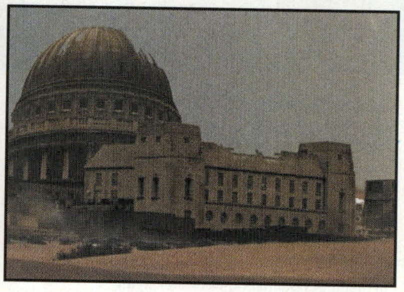
Time to add sun, sand and some subtle finishing touches to age the buildings



1 Add a background set of dunes (Background.psd on the cover CD.) Create a sun with the Circular Marquee and fill it with white. Set its Layer Blend to Hard Light. Use the Blur tool (R) on the layer mask of buildings overlapping the sun to make their edges blend in slightly.



2 On a new layer, use the Polygonal Lasso tool (L) with a Feather of 8 to draw an outline. Fill that with some clouds (Filter>Render>Clouds). On the layer's mask add some more clouds to make the layer randomly transparent. Colourise the clouds using the saved setting used for the buildings.



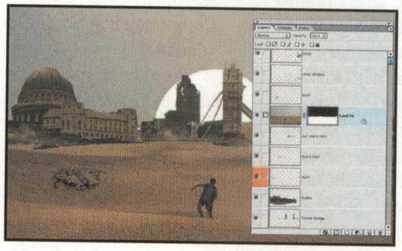
3 Time to age the buildings a bit more. Stain the stonework by applying the Burn tool (O) On each building's layer mask, use a black brush of varying sizes to paint out more of the roofs. Paint in a few girders behind the holes you make to hint at inner structure.

Part 8: Making the mask

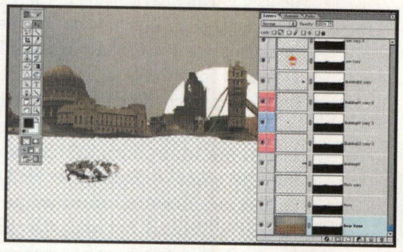
Create a final mask to enable you to composite the matte painting in other packages

Next stop?

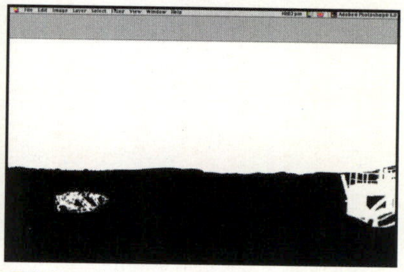
When compositing the matte painting with the foreground element in another package, the Alpha channel you created in the final step will work in the same way as the layer masks in *Photoshop*. The black and white mask will cut holes in your foreground live action so that you can see the matte elements poking through.



1 Go to each layer and choose Layer>Remove Layer Mask>Apply. (Set up an action to do this more quickly) On the sandy foreground reference layer, click on the layer mask thumbnail. Go to Select>All. Then click Ctrl/Command and I to invert the mask. Copy the inversed mask. Hide the foreground reference layer.



2 Now go to each layer (except the boat and dock layers) and click Add A Mask. Option-click on each mask thumbnail and paste in the copied foreground mask. Now any unwanted parts of the layers that strayed into the lower section of the image will disappear. On the Layers palette, choose Merge Visible.



3 Control-click on the merged layer thumbnail and Select Layer Transparency. Click on the Add A Mask icon and it will create a layer mask which you can use as an Alpha channel to combine the matte painting with the live action footage in the compositing package of your choice.

1. Cinergy's most recent project was a 15-second opening sequence for the hospital drama *The Critical Hour*, which was shown on Discovery Medical. "We depicted all the adrenalin involved in this hour: it was a sort of mini ER," says Leslie Allen, Creative Director. "We gave it lots of colour treatment, blooming the film out, but keeping it real. We used lots of medical visualisation as well - flying into bodies, with hearts pumping, lungs breathing. The medical side takes a keen eye," he adds. "You can't be wrong. We've got a huge library of medical books which we pore through."

Cinergy Creative

Cinergy Creative is all about: *"Utilising technology, and being smart about software choices and staff choices to create a new breed of company,"* says creative director, Leslie Allen

The name Cinergy, a fusion of Cinematic Energy, is appropriate for a company fuelled by sheer dogged hard work and an eye for feature film-style quality. "That's the goal, to be as good as what's on the big screen," says Creative Director Leslie Allen, who co-founded the digital design company two years ago with his partner Elizabeth Lough. "We make every job as if it's for film. It's the approach more than anything else."

It's an approach which sees Leslie and his partner Lizzie regularly working 100 hour weeks from their informal offices in Studio City, Hollywood, where Leslie's two 50lb Alaskan malamute dogs, Kenja and Kylie stroll around. But while the client list may be huge – Cinergy has done opening credits for *The Outer Limits*, and Disney's *Animal Kingdom*, trailers for Buena Vista's *End of Days*, and music videos for Ricky Martin – to name just a handful of recent commissions, the company prefers to calls itself a 'design boutique'.

Leslie, who is originally from North West England, was headhunted 10 years ago to design video games in Westlake Village, Los Angeles, and then spent five years as art director at Mass Media. Shortly after leaving in 1998, he worked as Director of CGI at Complete Post, Hollywood, and founded Cinergy a year later.

He still retains what he calls a 'Soho attitude' and is keen to avoid the Hollywood model, as exemplified by broadcast design company Pittard Sullivan, which runs the risk of expanding too fast to keep a handle on its assets. "The main thing is the body of work not the body of people," he says. "A handful can possess major skills. We're a Renaissance company – part of the process from A to Z."

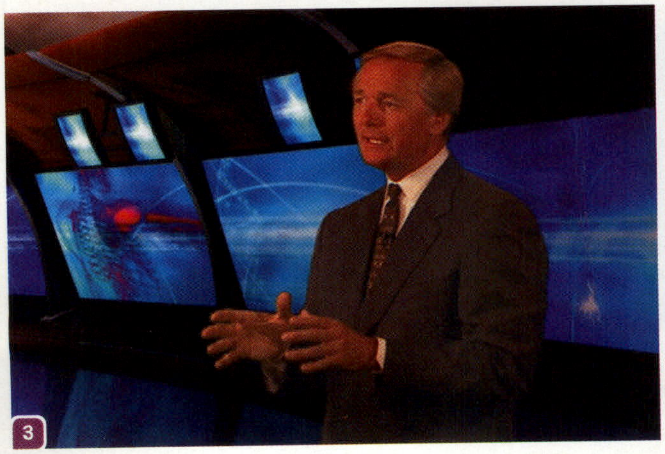
Freelances are hired as and when: "We have access to super-qualified freelancers with high-end gear, doing high definition work. We want to design a business model that makes the company a viable concern, with the skill set to go after the big jobs." ➤

The firepower....

Editing is done using *Final Cut Pro 2* on a G4. 3D work is constructed on multi-processor Xeon workstations, using Discreet *3ds max* and Alias|Wavefront's *Maya*. Compositing is done on a four- processor, 2GB MHz Intel Xeon worksation. "It's a monster," says Leslie, and rendering is sent to a multi-machine renderfarm. Software used is Eyeon *Digital Fusion*, Adobe *After Effects 5* and *Avid* for editing. Additional film and commercial work is finished on Discreet *inferno* and *fire* and Quantel Henry. "We are finding out however, that the fire power of the multi-processor Intel Xeon systems is catching up and more than adequate in most cases to complete film and hi-definition projects," he adds.

4

2


3

2. Cinergy's client for *The Amazing Race* was World Race Productions, with Bertram vanMunster and Jerry Bruckheimer as executive producers. The concept for the 45-second opening sequence to *The Amazing Race* was put together on the road. "Liz and I were leaving for a business meeting in Hong Kong and we got a phone call from the production studio. 'When do you need a concept?' we asked. 'Next week'. Lizzie and I conceptualised the idea on the plane and put storyboards together on a notebook computer in the hotel," explains Leslie. "We had to encapsulate the show in the first 45 seconds."

3. This *Virtual Set* shot was for an overseas production for a medical product called *Pancreas Tonic*. "We really went all out for this one, virtual sets and exploration of the human body."

4. The client for the *Destination Earth* show was LMNO which produces shows for Discovery and TLC. "We had to crank out good quality stuff fast," says Leslie. "We did 45 CGI shots in six weeks, everything from underwater cities to flying spaceships. We really loved doing this one – playing with topics like Roswell. We went to the desert to do some re-enactments, because we couldn't get the footage and created an alien. The whole thing was CGI, with lots of camera shaking at 24 frames a second to give the illusion of unearthing 15mm, beaten-up, cracked footage."

One of Leslie's favourite pieces of CGI, constructed for the opening titles of a Steven Bochco TV show called *City of Angels*, and delivered in hi-definition. "We were asked to create photo-realistic 3D angels for a ficticious hospital in Los Angeles. I think we pulled it off nicely..."

Talking of big jobs, Cinergy's recent commission for the new Jerry Bruckheimer show, the identity package and opening titles for *The Amazing Race*, was a minefield of secrecy. The 13-episode series follows (or followed, the final episode screens in the US in early December) the adventures of a group of contestants round the world, with people being eliminated, *Survivor*-style, at various stages. The first one back to New York bags the main prize of a million dollars.

"There were people in Vegas putting bets on this stuff! We couldn't give the game away," says Leslie. "It was pressure central." In compiling the 45-second opening titles for World Race Productions, the team had to avoid inadvertently revealing who survived, or what countries the contestants made it to.

The solution was to use a lot of creative licence. "We colourised things, put skylines in, created the illusion of datacam – the quality of the film became irrelevant. We got creative, and cut and pasted people onto different backgrounds." Faces bleached out by the film crews' harsh lighting were given tans, and the team tried to give a naturalistic *National Geographic* feel to the footage. "Every shot was colourised to the max," adds Leslie. The editing was done using *Final Cut Pro*, and fx work carried out with *3ds max, Digital Fusion* and Adobe *After Effects*.

Before Cinergy even reached this stage, though, which took about a month, it had to spend three weeks editing thousands of tapes of raw footage shot by 11 camera crews and local location crews. Bizarrely, despite the miles of tape, there were very few usable shots: with a million dollars up for grabs, few of the contestants wasted any time posing. "Most of the shots were of the back of people's heads," says Leslie. "We had to remove all the contestants, repaint hands, balance the lighting, clean people up and composite them to embody speed. No footage was allowed to leave the production building, so we had to go in-house and digitise the footage."

Taking it to the envelope

Less pressurised, but possibly more fun are the half a dozen projects for the Discovery Channel TLC that Cinergy has completed in the past year, most recently *The Critical Hour* (see page 64) working with the production company LMNO. "We love them, they know what they want," says Leslie with some relief. "We mostly do 3D opening titles – anything you can't film with a datacam." With a *Worst Case Scenario* show for the production team Avoca in association with Sony currently in production, and a sort of *Lost in Space* TV show for teenagers also in the pipeline, Cinergy shows no sign of slowing down. "We just take stuff to the envelope," agrees Leslie. "Our goal is to see how far we can take ourselves as designers, we want to be the best. We're much smaller than The Mill, but still a world class design company with clients from Asia to Europe."

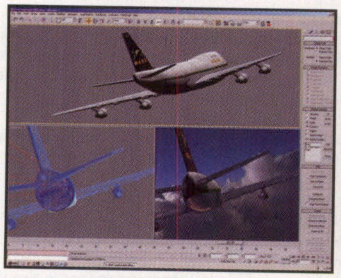
Although new offices just outside Hollywood are planned for next year, the company sees the future more in terms of maximising the available technology than physical expansion. "DVD is the way of the future. I see us really embracing the digital media and using it to our advantage. It's all about utilising technology, and being smart about software choices and staff choices to create a new breed of company. Everyone here works, we're adamant about paying talent. You're only as good as your talent."

There's more of Cinergy's work at **[w]** www. cinergycreative.com, or contact them on **[t]** +1 818 623 6558 **[e]** info@cinergycreative.com

The Amazing Race

The opening titles featured a combination of CGI effects and live action...

The Amazing Race logo starts off the title sequence immediately after a fast recap of the previous week's show. "With a title like *The Amazing Race*, we felt that something pretty amazing had better follow it up," says Leslie, "so we decided to launch off with an impossible shot. The concept was to approach a *747* from behind and soar right by the tail plane, over the right wing, passing by the canopy and then blast into the show's exciting footage." Cinergy speeded up the original footage twice to create pace. "The 45-second sequence is relentless, ending with another impossible shot of clouds morphing into coastline into desert. Cloud footage taken from a camera under a jet was increased in speed and the footage was stablised using *Digital Fusion* and the stablised footage was tracked. The clouds then generated camera data, which was exported to *3ds max*".



1 The Boeing *747* was modelled using *3ds max 4*. Textures for the plane including *The Amazing Race* logo were painted in the show's colours using *Photoshop* and then added to the model.

2 The *747* including motion blur was rendered out at 24 frames per second. Additional render passes were carried out for vapour trails and engine heat haze layers.

3 The *747* and the other rendered layers were then composited over the stablised footage using *Digital Fusion*.

4 Additional light effects which included streaks and lens flares were added using Adobe *After Effects*. Film grain and colouring were added and the shot was brought up to NTSC 30 frames a second.

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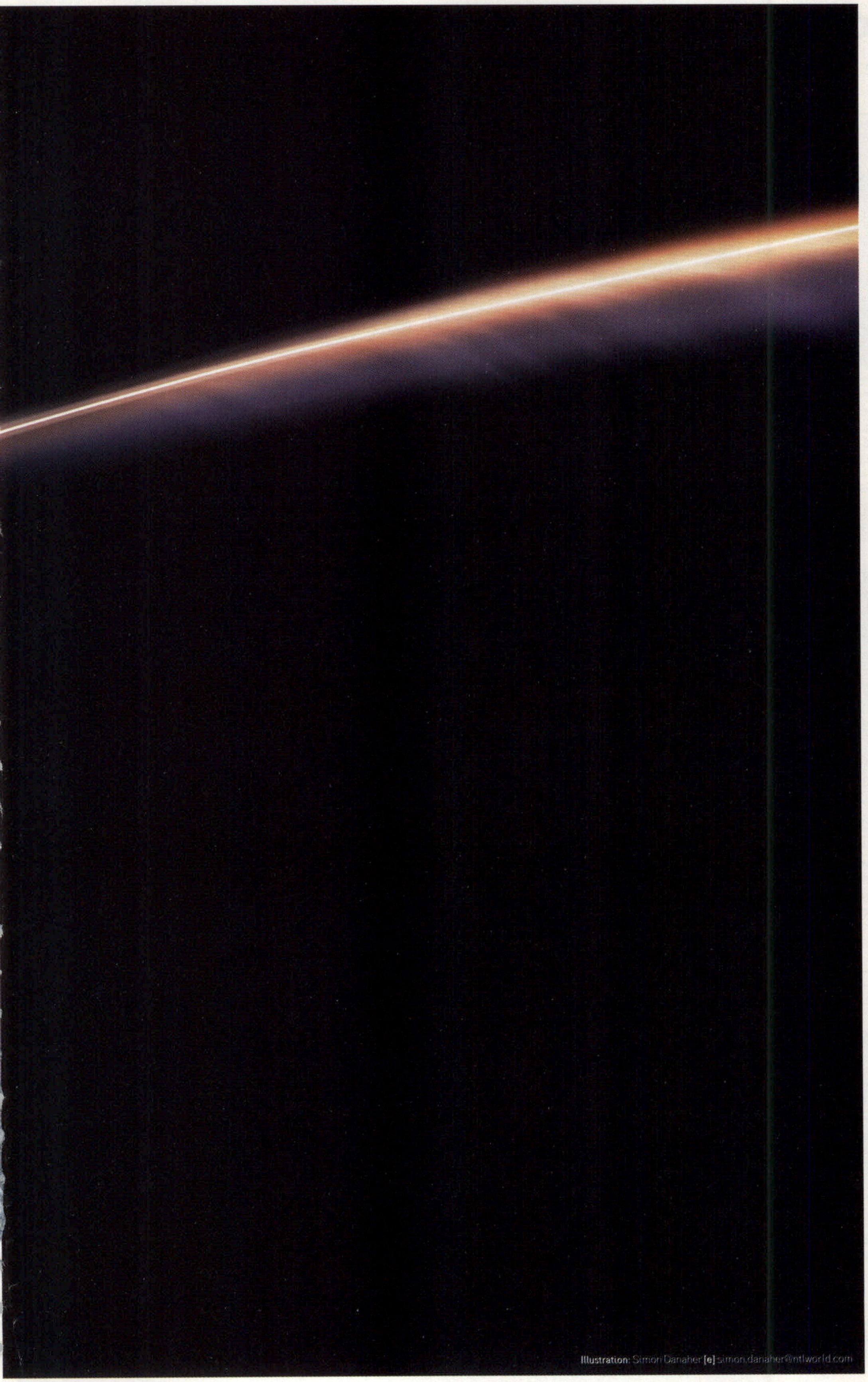


Illustration: Simon Danaher [e] simon.danaher@ntlworld.com

Exploding planet

Create an Earth impact effect using 3D graphics and compositing techniques in this explosive tutorial

When creating effects, a 3D program can be extremely useful, but creating one as complex as a meteor striking the Earth would take a lot of effort if done solely in a 3D program. In this tutorial, we'll use 3D to create the raw elements for the final sequence which will be composited in Adobe *After Effects 5.0*. By breaking the effect up into multiple effect passes and masks, you have much more control over the effect and reduce the amount of time required to render the result. It also means you don't have to wait so long test rendering to see if a particular parameter change is worthwhile.

In this tutorial, the Earth, which is a full 3D model, is rendered as a single frame which spans the entire sequence. You could animate the scene slightly to add some movement but we kept things still for the sake of simplicity. Though not 100 per cent physically accurate, the end result shows how you can build complexity into an effect using very simple rendering techniques and a compositing program. The Earth and meteor scenes as well as *After Effects* project files and footage are on the CD in the Tutorial\Exploding folder.

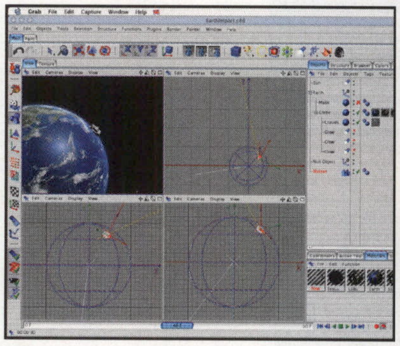
The files you need for this tutorial are on the cover CD in the Tutorials\Exploding folder. There are also demos for *After Effects* and *Cinema 4D XL7*. Expertise provided by Simon Danaher **[e]** simon.danaher@ntlworld.com

Part 1: Using lights to create the 3D matte passes

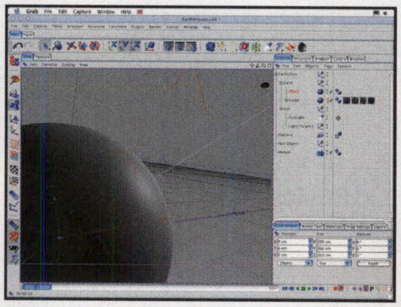
Using a 3D program, you can create 3D travelling mattes for creating effects in a compositing program

Cloud map

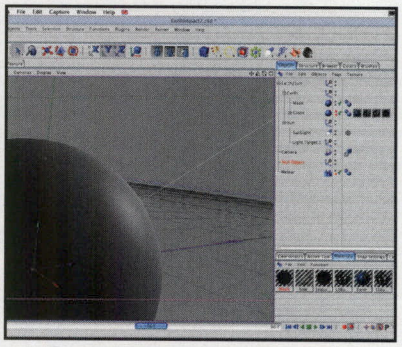
A large version of a cloud map for the Earth can be found at the link on this site: **[w]** http://personal.southern.edu/~dascott/tutorial01/Earth-Clouds4096.jpg. There's also a useful tutorial about how to make your own from satellite data on the same site.



1 The earth and meteor are already made, so open the EarthImapct.c4d scene from the CAs_Impact XL Scenes folder, after copying the whole folder to your hard disk. The scene has the textured Earth and the meteor already animated.



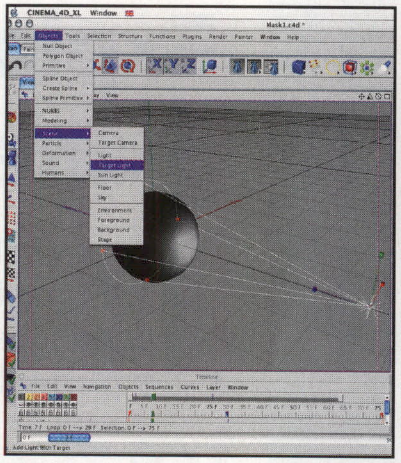
2 Scroll the Timeline to see the meteor's path and point of impact. If you open the Earth/Sun Object hierarchy and the Earth in the Object Manager, you can see that there is a Globe plus a Clouds object and another sphere called Mask. We'll use this to create a mask pass for the earth surface. Click the red X next to its name to activate it.



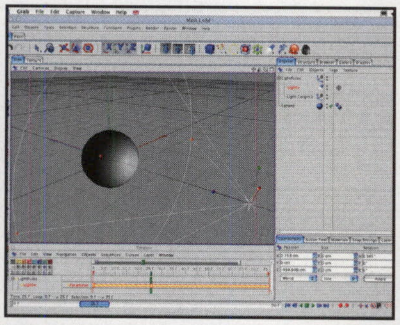
3 Also turn off the display and render visibility of the Earth hierarchy by clicking the two grey dots in the centre column of the Object Manager until they are both red. Turn off just the bottom grey dot for the Meteor so it displays but doesn't render.

Timeline

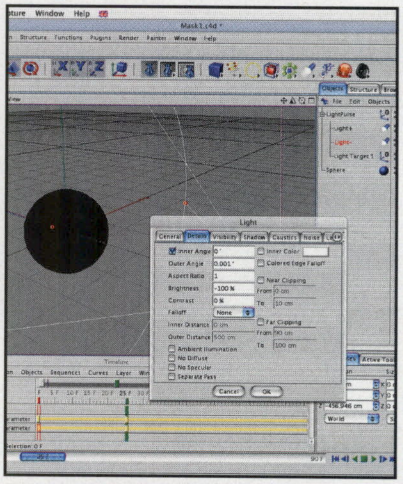
Dock the Timeline under the main views by dragging the Pushpin icon. A black line indicates the location the window will dock to when you release the mouse.



4 Create a new file so you can work without clutter to create the pulse effect lights. Create a Sphere, and also add a Target Light (Objects>Scene>Target Light). Open the Light hierarchy, select the light and enter a value of 0,0,0 in the Co-ordinates Manager.



5 We'll animate the light's cone angle. In the Time Control bar at the bottom of the screen, uncheck all the buttons at the far right, except the Parameter button (the big P). This enables you to create only a parameter sequence. At frame 0, set the Light's cone angle very small (from the Light Options dialog opened from the Object Manager, or by dragging the onscreen handles). Click the red Record button at the bottom of the screen, change the frame and set the cone angle out to about 60 degrees or until it more than engulfs the sphere) and record again. You can adjust the timing of the pulse by moving this key.



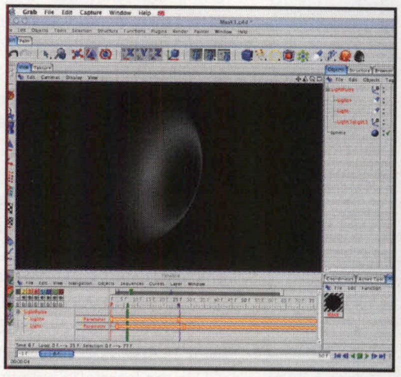
6 Ctrl/Command-drag the light in the Object Manager to duplicate it. In the Timeline, double-click the new light's first keyframe and in the Details Tab, set the Brightness to -100. Repeat for the second key.

World mode

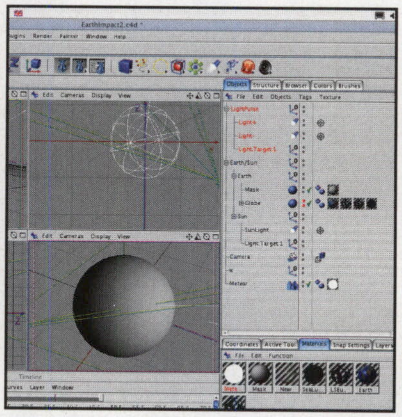
Make sure the Coordinate Manager is in World Mode then set all the objects in the LightPulse hierarchy to 0, 0, 0.

Meteor

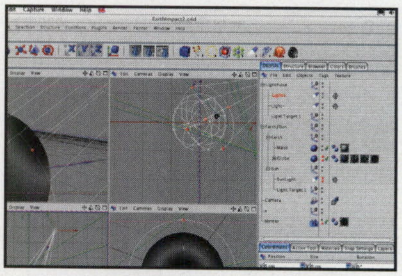
Give the Meteor a luminous material and render to the screen to help with the aiming process. Don't move the view itself using the window controls: you'll be moving one of the lights that it is linked to, which you don't want to do.



7 In the Timeline, select the negative light's sequence (the long bar) and drag it one frame to the right so its animation is delayed. The animation creates a ring that expands over the sphere when played (you can vary the softness of the ring by changing the Inner Angle for each keyframe, and the delay of the negative light).



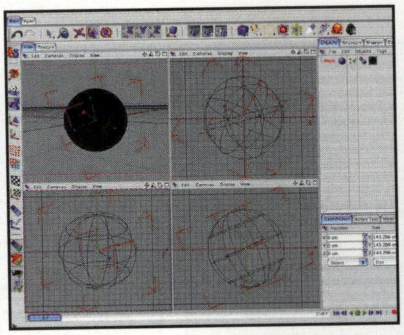
8 Rename the Light hierarchy something like LightPulse and the lights + and – then copy/paste it into the Earth Impact scene. You'll now need to align the lights so the pulse emanates from the point where the meteor hits the Earth.



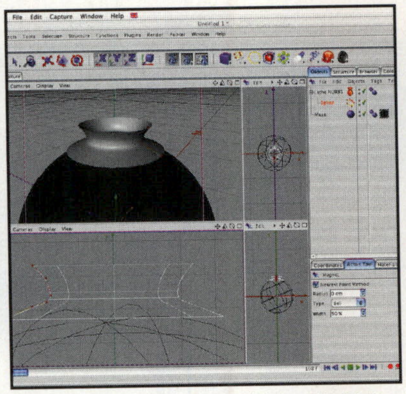
9 First drag the LightTarget object out of the LightPulse hierarchy so that it stays at the origin (where the Earth is located). Now by moving the LightPulse object, you can aim the pulse. To facilitate this with one of the Lights selected, choose Display>Link Active Object from any of the 3D View menus. Reselect the LightPulse object and move it. You'll be able to align the lights by seeing that the meteor is in the centre of this view at the impact point (about frame 48). This can then be rendered out. See the Pulse.mov on the CD – this step is EarthImpact2.c4d.

Part 2: Creating the impact wave

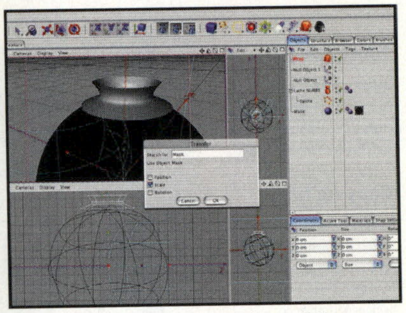
Individual elements of the effect can be created one by one in 3D, here's how the impact wave was done



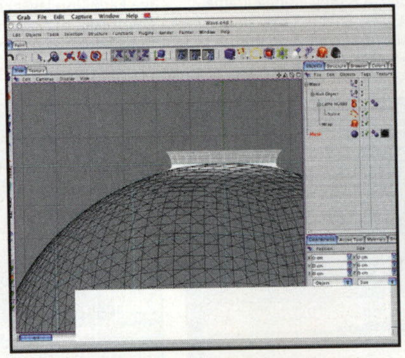
1 Next it's time to create the 'splash', the large impact wave expanding over the earth. The problem is just how to do this. Really it should be made of something that will render properly shaded, but we will simply use a luminous material and simple geometry. From the EarthImpact scene, copy the Mask object and paste to a new file.



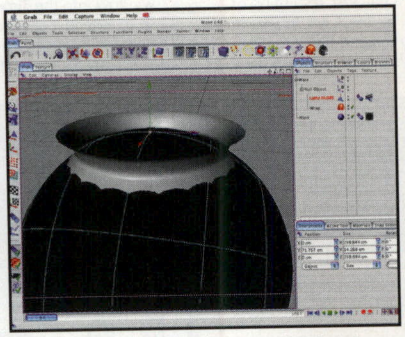
2 In the Right view (bottom-left) use the BSpline Curve tool and click above the Mask object to draw a curve for the wave. Create a Lathe NURBS object and drop the curve in it to lathe it.



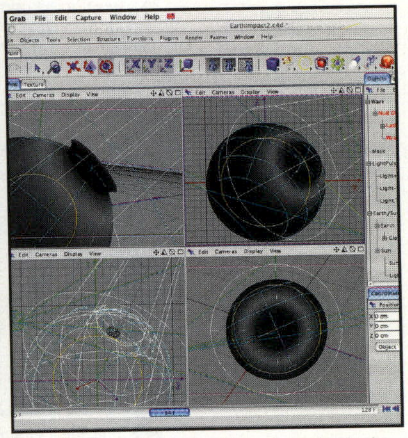
3 Add two Null objects and a Wrap deformer. Open the Wrap's options, change the Wrap Mode to Spherical and the width to 800 units (Height should stay 400). From the Structure menu, choose Transfer and enter Mask in the text field. Check only Scale and click OK. This transfers the scale of the Mask to the Wrap deformer enabling us to align more easily.



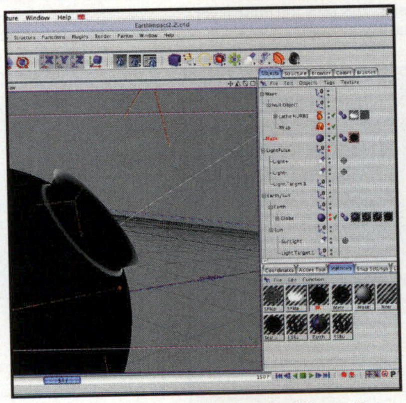
4 Next rotate the Wrap -90 in Pitch (from the Co-ordinate Manager) and move it in z so it lines up with the edge of the Mask object. Changing to Wireframe view will help. Next drag the LatheNURBS and Wrap into one of the Nulls, then move this hierarchy into the second Null. Name the topmost null Wave. You may need to scale the LatheNURBS in y to maintain the shape after the deformation, or move the points of the spline.



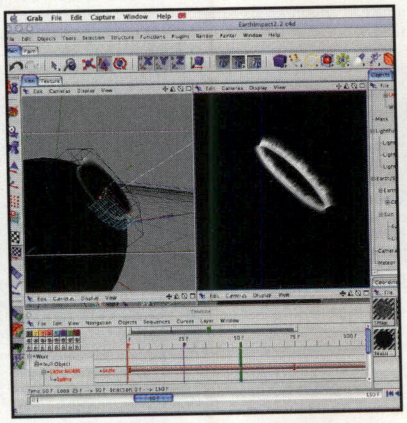
5 Select the LatheNURBS and enter Edit Axis mode (looks like a set of axes with no geometry in the toolbar on the left). Copy the y position value from the Wrap object to the LatherNURBS. Don't forget to change back to Object mode after. This enables us to scale the impact wave exactly over the surface of the mask object. The Wrap deformer set-up keeps things together. Try scaling the LatheNURBS object to see the result. This is the Wave.C4d file on the CD.



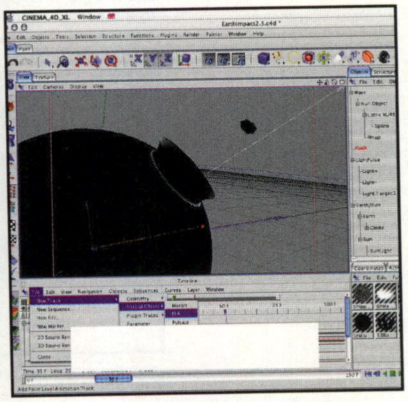
6 Copy the whole Wave hierarchy back into the EarthImpact scene. Open the hierarchy and select the child Null. You can now rotate this Null to centre the wave where the meteor impacts (if the pulse lights are still on, use these to help too).



7 To save time, open the scene EarthImpact2.1.c4d on the CD. This is basically the same but with the texture applied to the wave geometry. Now to create the wave animation, turn off the pulse lights and the Earth. All you want on is the Sun light and the mask object (which has a completely black material).



8 Animate the scale of the LatheNURBS object to create the desired effect. We also added some Point level animation (PLA) to the Spline to change the shape of the wave as it progresses. The Timeline can be found under the Windows menu and it's useful to dock it at the bottom of the screen.



9 A PLA track can be added from the File>NewTrack>Special menu in the Timeline. Ctrl/Command-Click on the sequence to add keys after you edit the psline points. The animation can be rendered using the main scene camera ready for compositing. See the File EarthImpact2.3.c4d and ImpactWall.mov on the CD.➤

Part 3: After Effects

We'll create the entire effect within *After Effects*, which has all the tools you need to create incredible effects very simply – here's how

Timebase

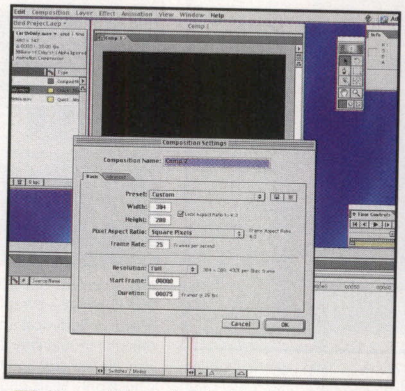
Before starting, Choose Edit>Project Settings and change the Timebase to 25 fps and Display Method to Frames.

Copying files

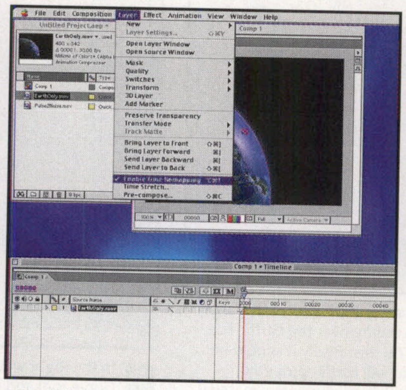
It's best to copy all the support files to your hard drive or *After Effects* will read them from the CD which will hamper performance.

Assigning RAM

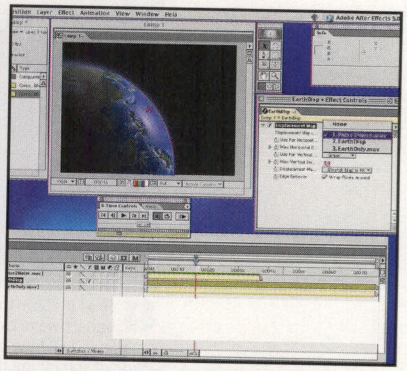
When using *After Effects*, assign as much RAM as you can to the program (Mac OS 9) because the RAM previews eat into memory.


Composition Settings
Composition Name: Comp 2
Preset: Custom
Width: 384
Height: 288
Pixel Aspect Ratio: Square Pixels
Frame Rate: 25 Frames per second
Resolution: Full
Start Frame: 00000
Duration: 00075 Frames @ 25 fps

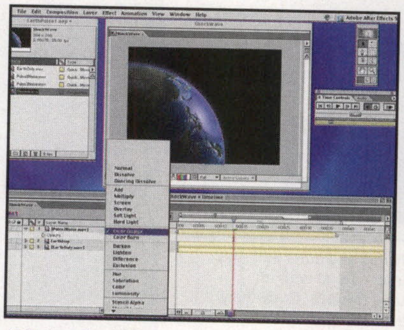
1 Now we'll begin building the effect in *After Effects*. Create a new three second composition (Composition>New Composition) in a New Project using a half PAL resolution of 384x288 square pixels, 25 fps. Choose File>Import files and locate the prerendered files supplied, EarthOnly.mov and Pulse2Nose.mov, on the CD.



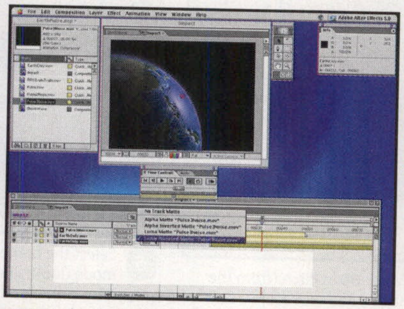
2 If the Interpret Footage dialog opens as the footage is imported, click the Guess button. Now drag the Earth footage from the Project window into the Timeline. It is only a single frame, so to extend it choose Layer>Enable Time Remapping and then pull out the layer in the Timeline so it spans the full 75 frames.



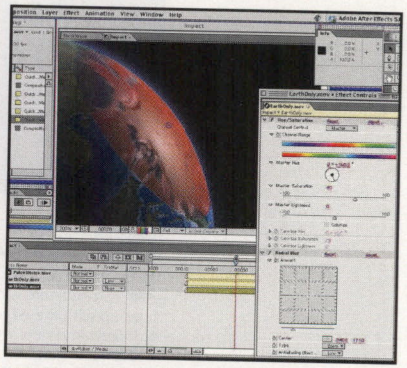
3 Hit Return to edit the Earth layer's name and type EarthDisp. It will be displaced by the Pulse2Noise footage, so add this to the top of the layer stack and turn off its visibility for now. Select the EarthDisp layer and choose Effects>Distort> Displacement Map. In the Effects controls, set Pulse2Noise as the layer as the map. Press Play. It's not perfect but you can see the results.



4 Imagine it's a superheated air shockwave causing a refraction and you'll get the idea. Change the effect amplitude horizontally and vertically to adjust the strength of the effect, say 1.0 for now. Turn on the Pulse2Noise layer, press the Switches/Modes button to show Blending modes and change to Colour Dodge mode. Press the t key to show Opacity and reduce it. This intensifies that area making it more visible.



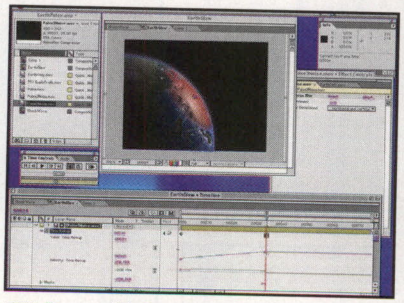
5 In the Project window, select Comp 1, press Return and rename it Shockwave. Create a new Project and add the EarthOnly.mov. Import the file Pulse3Noise to the project. Pulse3Noise is the same as Pulse2 except the negative light was turned off. Duplicate the earth layer (Ctrl/Command-D). Add Pulse3Noise as a layer above. In the Blending Modes section, change the Track Matte mode of the lower Earth layer to Luma. This uses the Pulse layer's pixel brightness as a mask.



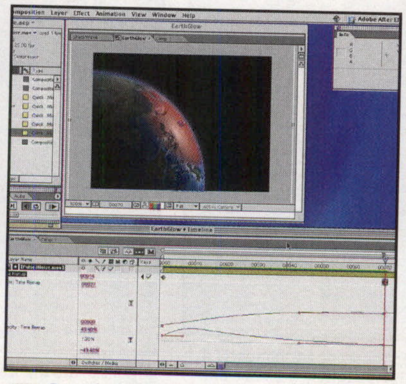
6 Now add a Hue/Saturation effect from Effects>Adjust. Increase the Saturation and drag the colour wheel until the blue water turns orange. Add a Blur>Radial Blur effect set on Zoom. This disperses the details in the layer as if swept away by the explosion. Finally to soften the edge of the matte, add a Gaussian blur to the pulse layer.

Frame blending

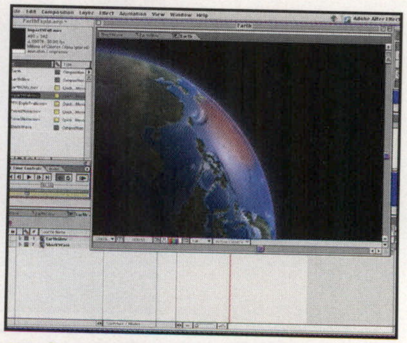
Enable frame blending for any tracks that have been Time Remapped (apart from those that are only a single frame) to smooth their animation.



7 Rename this Comp EarthGlow. We can adjust the timing of the glow expansion because we don't want it to go all the way round the earth or at the same rate as the shockwave. Select the Pluse3Noise layer and enable Time Remapping. Unfold the layer and the Time Remapping subcategory. Select and drag the last value key (upper graph) and drag it halfway. This shrinks the radius of the glow by holding it at that value.



8 Drag the last keyframe in the main track (the black diamond) to about frame 70. Ctrl/Command-drag the value keyframe in the graph to pull out a Bézier handle to the left. This eases the motion into the keyframe.



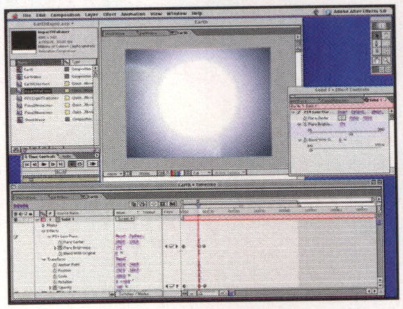
9 Create another Comp and drag the EarthGlow and Shockwave comps into it with the EarthGlow comp uppermost. Click the EarthGlow tab in the Timeline to go into its comp and turn off the background earth layer which was there mainly as a visual aid. Play the sequence. This is the file EarthPulse.aep on the CD.

Part 4: Adding the explosion and final details

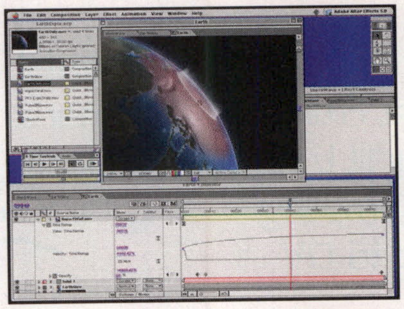
The bright flash can be created using our often-overused lens flare. It'll only be visible for a few frames and because of the angle it won't look too cheesy

Parameters

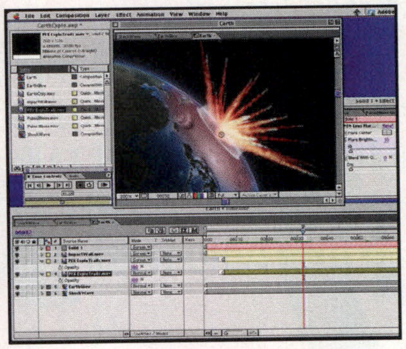
To animate any parameter in *After Effects*, click on the parameter's Clock icon in the layer.



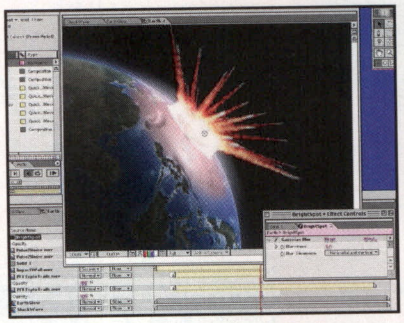
1 We can add a flash from the initial explosion using a lens flare. Add a black Layer Solid (Layers menu) set to the Comps dimensions and used in Screen Mode. Apply the Effects>Render>PS Lens Flare filter to it, set to 105mm Prime. Open this filter's parameters in the solid layer and animate the flare brightness. Set it to 10 (the minimum) at frame 0, 175 at frame 6 and 10 at frame 8. Animate the layer's Opacity to actually zero the brightness.



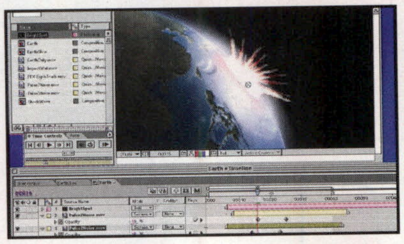
2 Import the files ImpactWall.mov and PFXExploTrails.Mov from the CD. The first is the result of the render from step 2, the second is some particle effects created in *Lightwave 7*. Add the ImpactWall and set it to Screen Mode. Animate the opacity to fade it in and out (it'll get more diffused as it expands). Using the Time Remapping, you can also slow its expansion rate as we did before on the pulse layer.



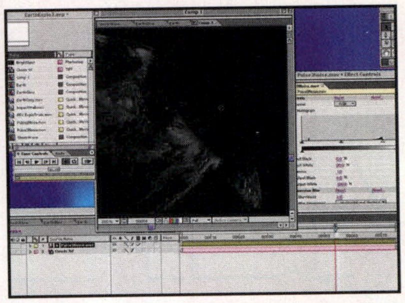
3 Add the particle footage and duplicate the layer. Scale one down much smaller: we can double up on the effect without having to render two different passes, saving a lot of time. Set the larger one to Screen or Add and place them both below the ImpactWall layer. This is the file EarthExplo.aep on the CD.



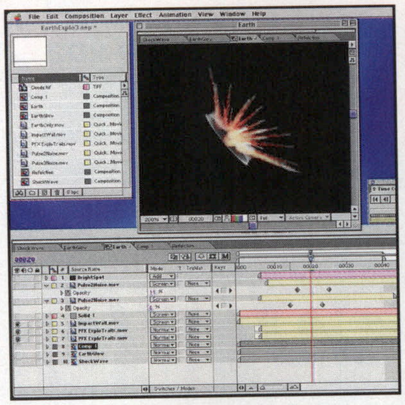
4 To blend things together and add a bit more brightness to the explosion, import the file BrightSpot and place it at the top of the layers stack. Set it to Add Mode and blur it slightly. Move it off the Earth's surface so it looks like the atmosphere is glowing. Animate the brightness so it fades up quickly after the initial flash then fades gradually.



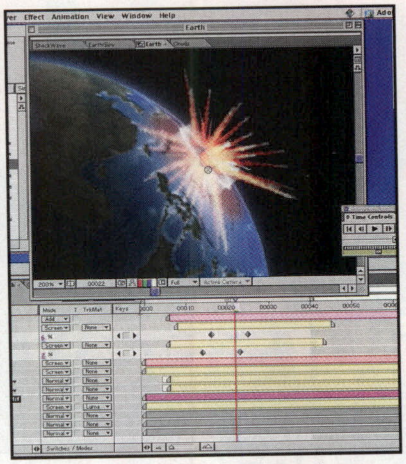
5 We can add some more detail to the composite by reusing footage that we already have. Add another instance of the Pulse2Noise footage, set it to Add Mode and move the track so it chases the original shockwave. Animate the opacity to fade it out quite quickly. You can duplicate the layer and move the track to create another delayed wave. We also went back to the Shockwave comp, added some blur to the pulse layer and animated it as well as the layer opacity because it now looked too hard. This is EarthExplo2.aep on the CD.



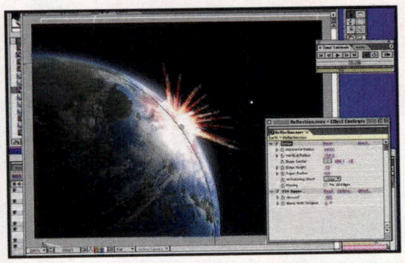
6 Now add the clouds to the naked Earth and animate their evaporation. Create a new comp, import the Clouds.tif file and drop it in. Add the Pulse3Noise footage above it as a Luma inverted Matte and blur it slightly. Add this comp to the main Earth comp above the EarthGlow layer. Use Levels to adjust the lightness of the clouds and Time Remapping to adjust the speed of the evaporation.



7 For the final touch, add some reflection in the oceans. Render out just the wall and particle layers to a movie file (if using the *AE* demo this has been done for you in the file Reflection.mov on the CD). Import the reflection.mov and landmask.tif files and drag them into the comp under the clouds layer. LandMask.tif was created in *Cinema 4D* using a luminous texture.



8 Flip, rotate and move the reflection layer so that it roughly mirrors the explosion. Use the LandMask layer as a Luma matte for the reflection layer. You'll find it easier to position if you turn off some of the other layers.



9 Distort the reflection layer using the Distort>Bulge effect. Match the size of the bulge to the Earth in the sequence (you'll need to move the centre off screen for this). This makes the reflections look more convincing, and to finish off the effect, add some PS Ripples to disrupt them. The final file is EarthExplo3.aep and the finished movie Earth Impact fin.mov can also be found there. Note: We've created the entire explosion over 75 frames to keep the files small and the tutorial efficient so that you can see the results quickly as you work through it. If you were simulating this sort of large-scale event for real, the explosion would evolve over many more frames. See the movie file Impact Slower.mov as an example.

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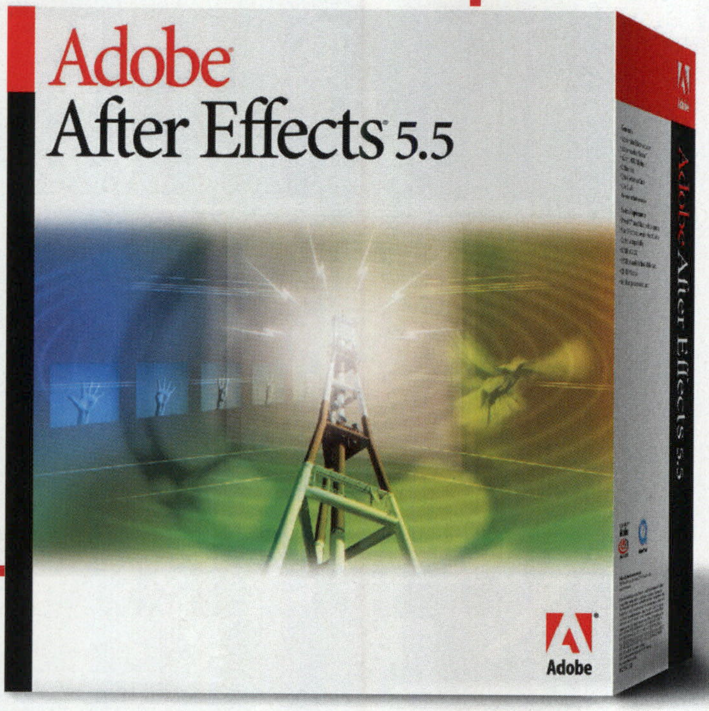


Win After Effects 5.5

Four copies of the brand new release up for grabs, worth over £600 each, courtesy of... Adobe

This month, *Computer Arts Special* has teamed up with Adobe to bring you the chance of winning one of four copies of the yet-to-be released *After Effects 5.5* – the company's top compositing and special effects application.

Version 5.5 adds to the already packed feature-set of version 5, bringing native Mac OS X support, and the ability to import and export a huge range of file formats including SWF and RealMedia.

Also new to the application are coloured shadows and projection layers – ideal for manipulating lighting in 3D compositions, adjustment lights, multiple 2D and 3D views – for seeing just how layers interact in space, as well as five new effects.

Thanks to the Levels effects, you can perform detailed colour correction by setting keyframes for individual channel properties. You can also now produce animated four-colour gradients, and even produce an animated cellular noise pattern for a background, using the Cell Pattern effect. There's a new Grid effect enabling you to create customisable grids as masks and a Roughen Edges effect for eroding the edges of a layer's Alpha channel. Finally, the Time Difference effect makes it a breeze to calculate the colour differences between two layers over time.

Add to this a host of masking improvements, enhancements to expressions, a new Effects palette for organising and applying multiple effects and Post Render actions and you have an upgrade that looks like being a winner. See the full review in issue 66 of *Computer Arts*, on sale 18 December. In the meantime, to stand a chance of winning a copy answer the simple question below and drop us a line...

The question

In *AE 5.5*, which new effect makes it easy to calculate the colour differences between two layers over time?

To enter

Simply click the Compo button from the *Computer Arts Special* CD interface and then enter *After Effects 5.5* as the competition name. Then select your answer and fill in all the other details and click Submit Entry. Don't worry if you're not online, you can still enter by post.

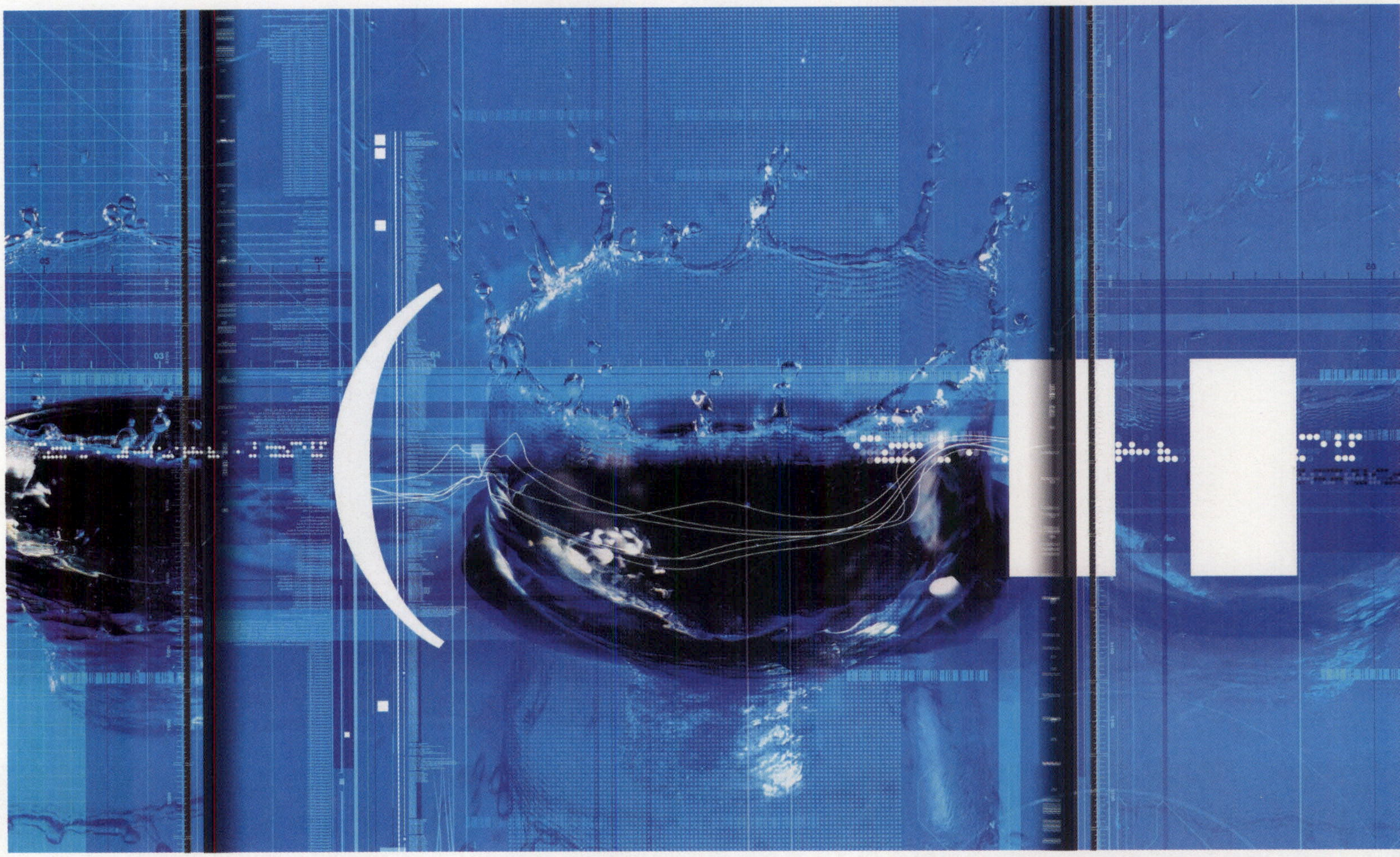
Just write your answer, name and address, and platform (Mac or PC) on a postcard and send it to After Effects 5.5 comp, *Computer Arts Specials*, 29 Monmouth Street, Bath BA1 2DL. Include a phone number where you can be reached during the day.

For more info on *After Effects 5.5* go to [w] www.adobe.com

Exceptions

The closing date is 9th January 2002. Employees of The Future Network, Adobe and any of their agents or families may not enter the competition. One entry per reader. The editor's decision is final. No correspondence will be entered into and there is no cash alternative. No purchase necessary. ca>s

Illustration: Rod Steele **[e]** rod_steele@blueyonder.co.uk **[w]** rodsteeledesign.com



Slo-mo effects with combustion

In this tutorial, we'll be using *combustion*'s frame blending and time re-mapping features to create a realistic slow motion effect

Since its launch last year, Discreet's *combustion* has received numerous accolades. Its impressive resolution independent vector graphics combined with features ported directly from the industry big boys *inferno* and *flame* mean that smaller studios finally have the power to create top-end cinema quality effects without (literally) having to take out a mortgage.

Its compositing and keying tools are unrivalled by any other product and its other innovative features enable you to create effects that you just can't do with other software. Even better, projects from high-end packages like *paint* and *effect* can be directly imported for compositing usage.

One of the age old problems for artists working on DV footage is that DV cameras shoot at a maximum of 30 frames per second, meaning realistic slow motion shots require re-shooting with incredibly expensive analogue or digital cameras with specialist FPS rates of 48+. We will be showing you how to use *combustion*, with live features from the demo on our cover CD, to set up, prepare footage and use the excellent frame blending and time re-mapping features to create a realistic slow motion effect. By doubling the frame rate but losing none of the quality, as happens in so many jerky slow motion shots you see on low budget films, you will see some of *combustion*'s awesome power.

The three pieces of footage have been compressed because of space limitations on the cover CD but there wouldn't be any loss of image quality when using uncompressed footage.

Files on disc

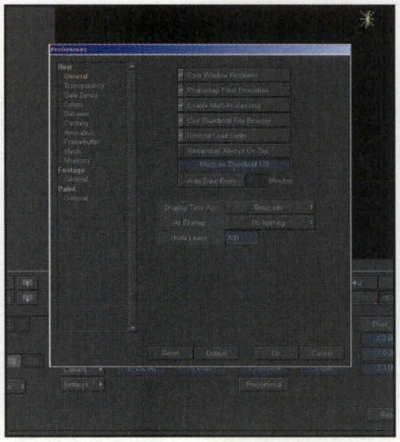
Raw footage and examples for this tutorial are in the Tutorial\Slomo folder on the cover CD. There's also a demo of *combustion*, for details of prices go to **[w]** www.discreet.com. Expertise provided by Mark Towse **[e]** mark@bigimpact.tv

Part 1: Preparing combustion and importing

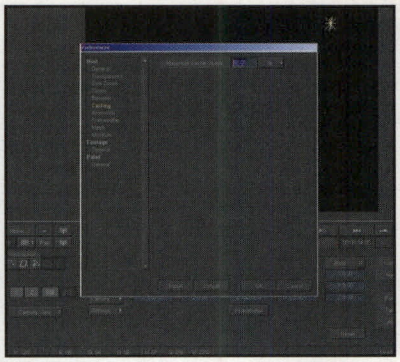
To get the most from the tutorial, *combustion*'s plethora of settings need to be correct for your computer...

Cover demo

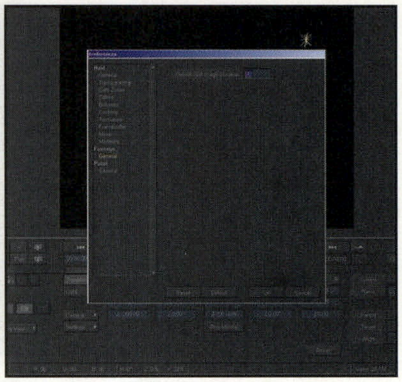
Our cover demo is save disabled and any rendered output has a lovely big red X going through it. Don't worry though – all the tools you need to complete the tutorial are live and enabled.



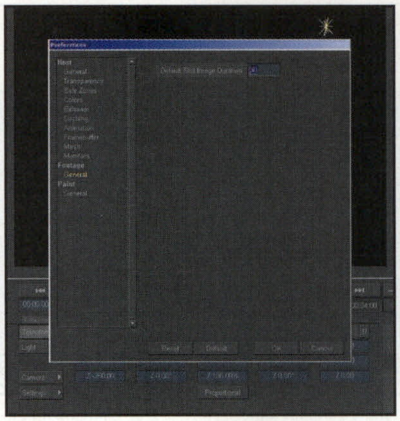
1 Start by installing our exclusive *combustion* demo from the cover CD. Start up the software and click File and Preferences.



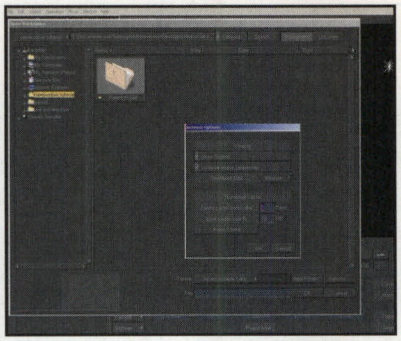
2 For standard workstations, most settings should be fine. You may find, if you are using other programs at the same time, that you need to reduce the maximum cache usage – this is the amount of RAM used to handle the video. Click Caching and select 80 per cent: this helps speed other operations when jumping between apps.



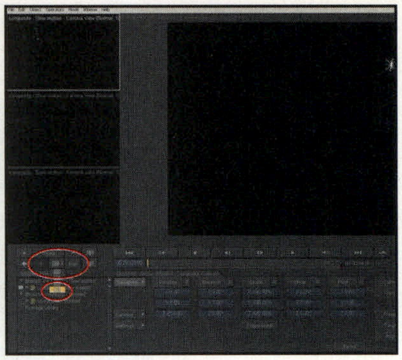
3 We are in the UK, so our standard DV system is PAL DV, which operates at a resolution of 720 by 576 and at a frame rate of 25fps. Click Footage>General and change the 30fps to 25. If you are in another country, set the frame rate to match your local system frame rate.



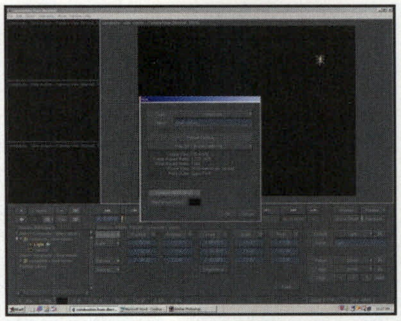
4 Settings are saved automatically, so don't worry about clicking Default. This option enables you to modify the length of time a still image will display for in the Timeline. Click OK.



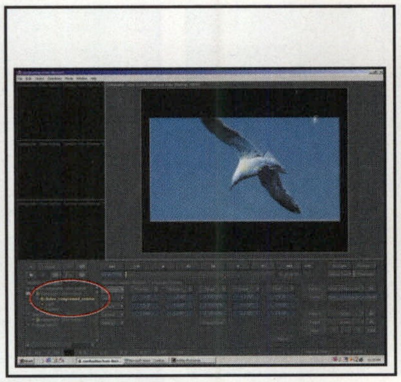
5 Click File>Open workspace and a vaguely Windows-esque Explorer will appear. This has special functions for large projects, including a complete filtering search engine. Select the location you want to store the project in and create a new folder, named Combustion Tutorial. Copy the footage file from the Tutorial\Slomo folder on the cover CD to this folder.



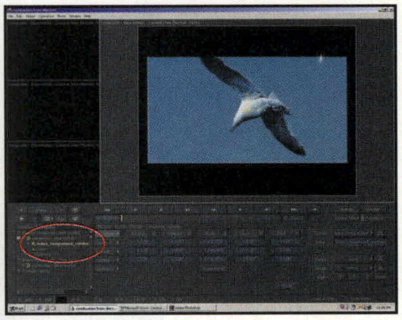
6 Later, we will save a workspace into this area. For now, click on the small monitor and select the 3 side, 1 main Workspace view. Your screen will now look like this. *combustion* enables you to see a different angle in each of the Viewing panels so you can view different job settings at the same time and compare composites.



7 Click the Main view and in the File menu, click New. Composite, which we want to create, is selected automatically. Call the Composite Slow Motion and choose your desired broadcast format. We are using UK PAL DV. Should you require, you can also modify the Aspect Ratio. Set the Composite Length to 8 seconds, twice as long as the footage. You can click on the edge of the input box and drag left and right as a useful shortcut.



8 In the bottom-right of your screen, click Branch Slow Motion which is a subfolder of Composite Slow Motion. Now click File>Import footage, navigate to your Combustion Tutorial folder and select the tritone footage of a flying seagull.



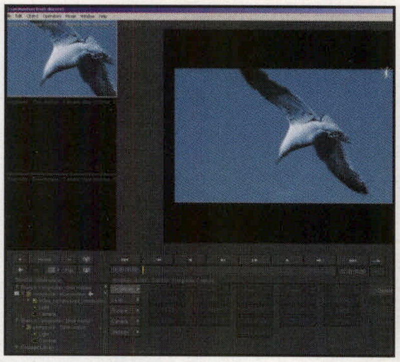
9 *combustion* centres the footage and in the Python Exploring menu you will see the name of the imported footage. This small Windows-style Explorer is similar to that in many high-end 3D applications. Basically effects, transformations and the like can be applied to individual elements, like our footage, or entire folders and groups of folders and composites: very useful. The entry is now known as a footage operator. ➤

Part 2: Slowing it all down

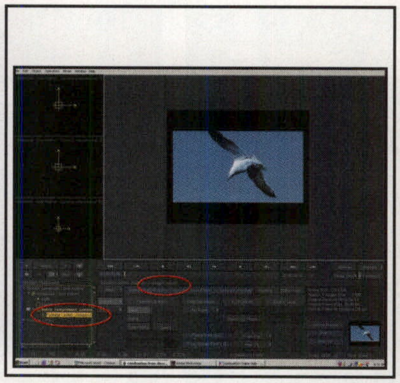
The next stage is to double the length of the footage by modifying the time controls...

Blurred effect

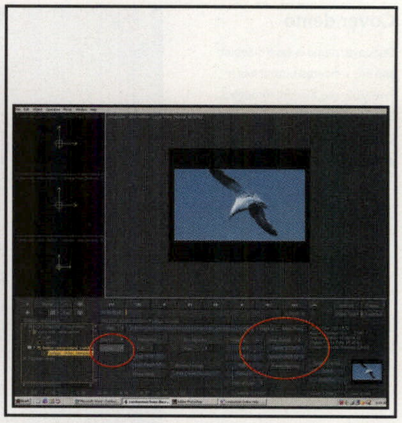
You can use the concepts in this tutorial to effectively slow motion a shot to about three times its normal length. After this amount, the interpolated screens look blurred for too long and begin to degrade the effect; although sometimes this can be used as an artistic effect in itself.



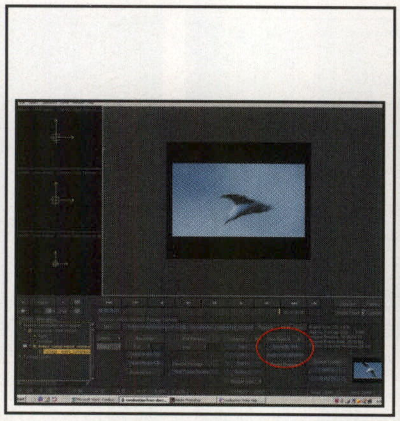
1 Click one of the three smaller views and press the space bar. *combustion* renders to the active window directly to RAM, but only as much footage as there is – the black period after the four seconds runs out won't render. You can see how much of your RAM has been used in the dynamic gauge at the bottom-right.



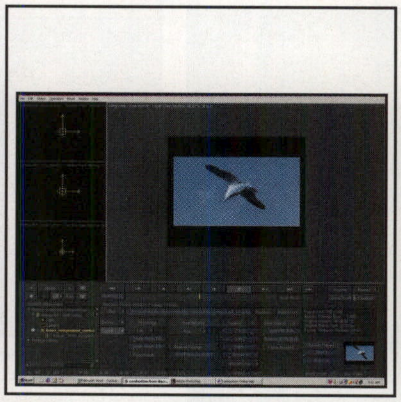
2 On the footage bar, in the centre, you will see a small red dot where the footage's out point is. Click on the name of the footage in the mini-Explorer and you will be given the footage operator's contextual workspace to operate in, enabling you to modify the time controls.



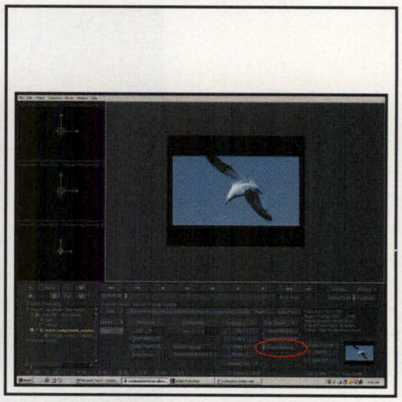
3 From the new set of footage controls, click the Output button, which houses the controls we are after. You should see Time Stretch as a new button toward the right-hand side of the screen.



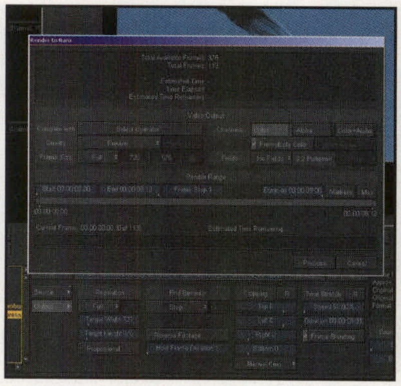
4 In the input field below Time Stretch, which lists the present length of the footage, double the length of the footage and type in 8 seconds, or use the side drag on the Input field.



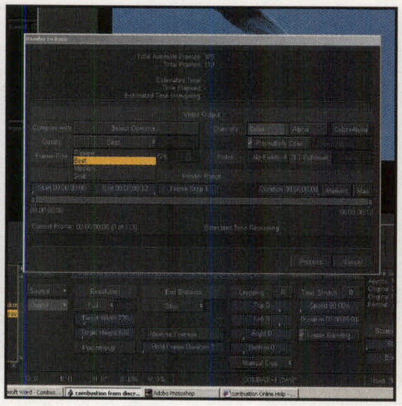
5 Now press space and the modified Time Stretch will be in action. However, despite the new slower motion, we want to blend the newly interpolated frames to give a smoother, more realistic slow motion effect.



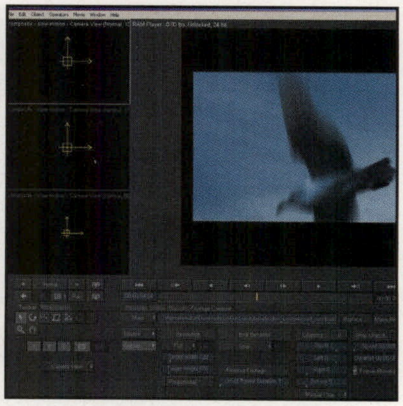
6 Underneath the Time Stretch controls is another button called Frame Blending. Click this now, and make sure Frame Blending is only ever turned on after the time stretch figure has been modified or the blends won't occur properly.



7 Frame blending creates new, interpolated (guessed) frames which are a mixture of the two on the old frames either side. We are going to test render the created longer piece of footage, press Ctrl/Command+Shift+R or go to File>Render To RAM.



8 The new option box enables you to modify the RAM preview quality and if using different footage, enables you to render preview different fields – imported for imported analogue footage. Leave the other options blank at this stage.



9 Preview this final footage element and notice how we have created an incredibly smooth, double duration segment in no time at all. However, we can make the footage improve to an even greater degree.

Part 3: Improving and comparing

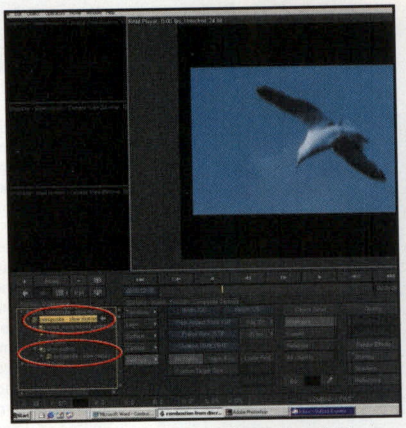
combustion's multiple workspace architecture enables you to directly compare up to four different sets of footage at the same time – we will be doing just two

Improved timeflow

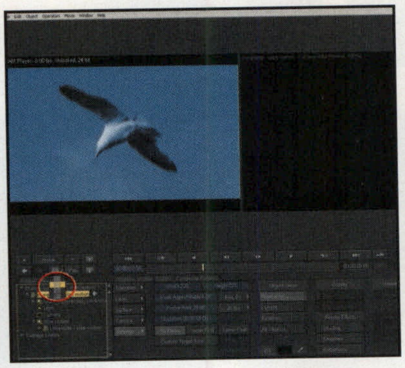
Thanks to the object-oriented approach of *combustion*, you can have different clips in the same composition running at different rates of time distortion, unlike in *After Effects*. Despite the end result being the same, this is a real timeflow improver.

3D concepts

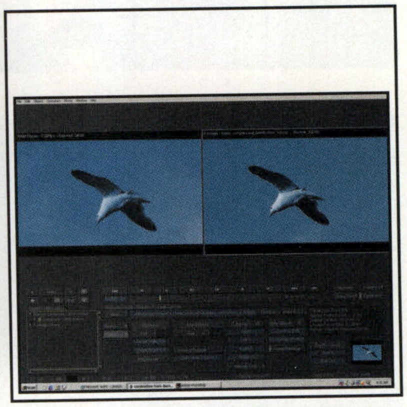
combustion is geared up for 3D, and operates very much like a 3D application at various points of your workflow. Knowledge of rudimentary 3D concepts enables you to create footage fly-ins and camera and lighting effects without the need for a standalone 3D app.



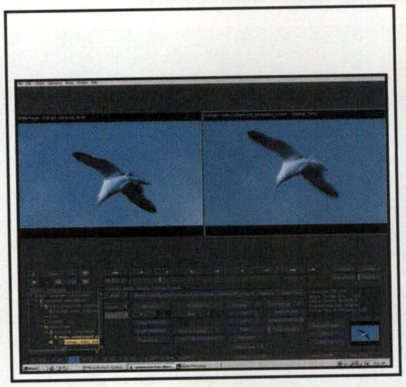
1 In the Explorer, click on the Composite Slow Motion Operator and paste. Move the copied composite to the bottom of the stack by simply mouse-dragging.



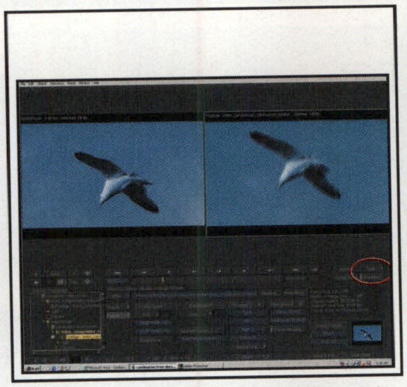
2 Twirl down the copied composition: we are going to modify our time stretch in the new composite and preview it next to the old one created, to make sure we have the smoothest and best possible footage for our final output. Click on the Screen Mode box and select the Two Preview Window option.



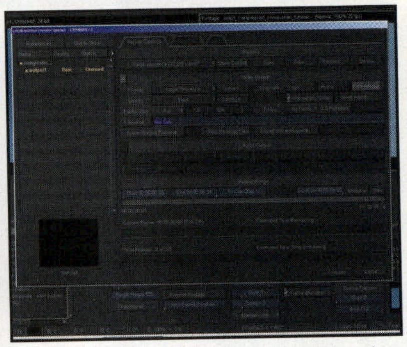
3 In the left box is the initial, RAM previewed slow motion composite. In the right-hand window, right-click and from the mini pop-up menu, choose Select Operator. We are going to pick the copied composite which we will modify.



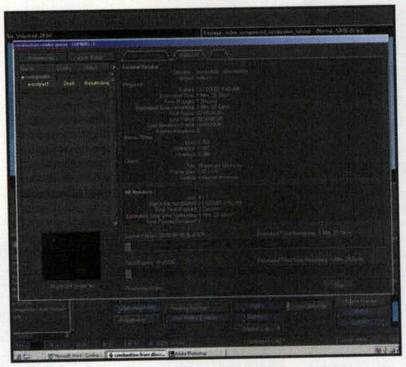
4 Twirl down in the Explorer to the new Footage Modifier. It will have the same Time Stretch properties as the initial footage we modified. Now change the Time Stretch to a lower 75 per cent rate. The clip should now last six seconds – not as long as we need, but smoother for now.



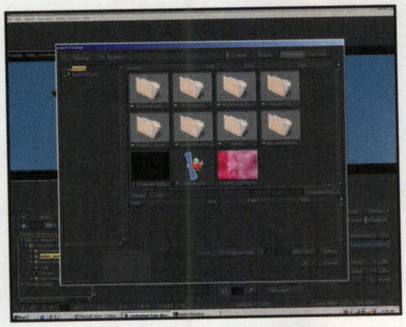
5 Click on either window to make it active and use the space bar to do a quick preview render. If your computer has less than the recommended RAM of 512MB this may be a little slow, so you can alter the quality of the preview by clicking the box circled in the screenshot.



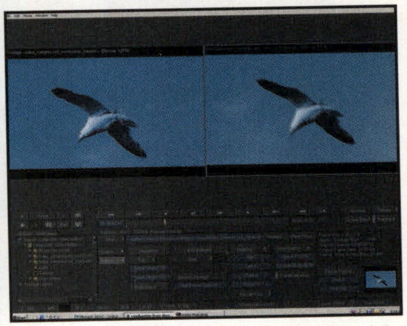
6 Obviously, the second shot is smoother (as less has been interpolated), but it's too short – how do we get the smoothness improvement from the 75 per cent speed footage but the duration of the 50 per cent footage. By compound time-stretching, that's how! We are now going to perform a final render of the 75 per cent piece of footage. Press Ctrl/Command+R, or File>Render.



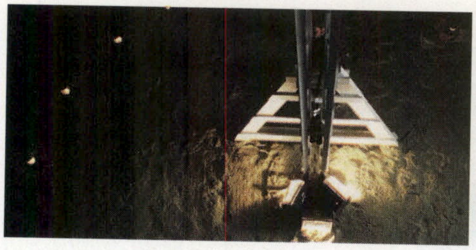
7 Select .avi draft quality from the presets box at the top, select a filename (we have used 75 percent), ensure no fields are turned on and that the render range is left as is and click Process. The Import Into Workspace option saves you having to search for the new footage which we will import after the render is complete.

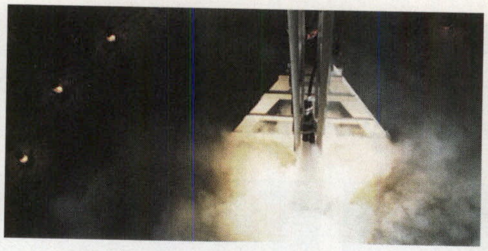


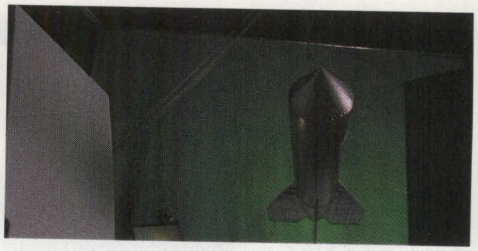
8 To achieve the highest quality, we now create a new composite within our present overall project and File>Import Footage>Select the new '75 percent .avi footage' we have just rendered. Perform the same time stretching operation on the new piece of footage, setting the Time Stretch again to 75 per cent. So we have two smooth additions of 25 per cent, instead of one less perfect slo-mo of 50 per cent.

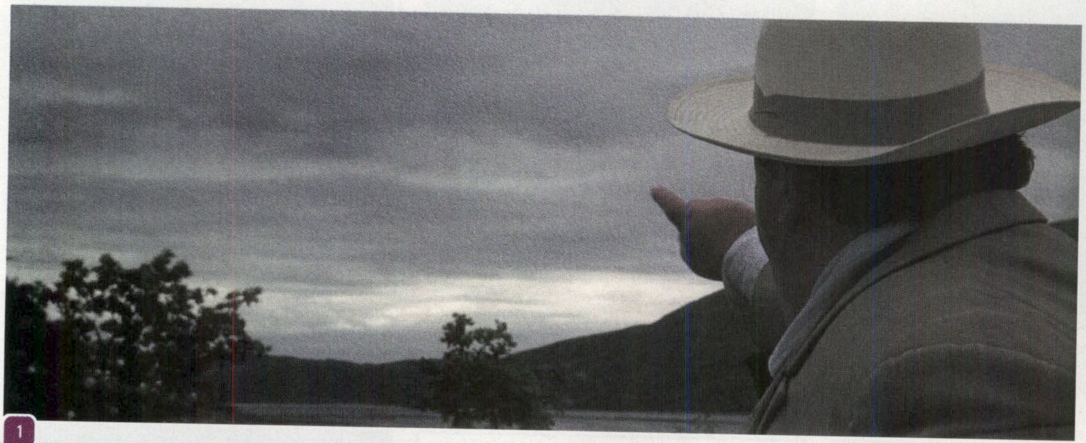


9 On the left-hand side of the screen, right-click and Select Operator. Click the newly created composite and compare it to the 75 per cent footage we stretched and blended last time. The same level of smoothness, the extra duration – perfect. To produce this effect would normally cost around £800 to hire the analogue equipment, along with stock costs. Amazing what a little knowledge and the right software can do! ca>s









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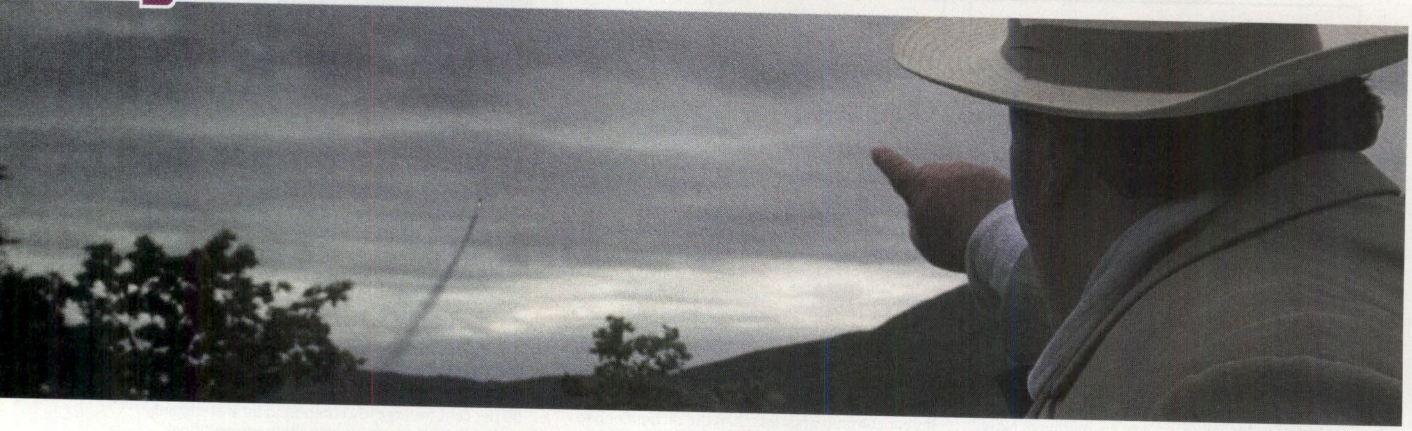
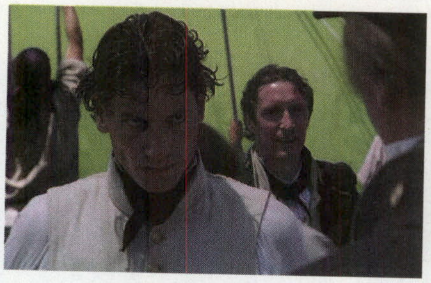


1. Men From Mars generated around 40 shots on the forthcoming film *The Rocket Post* [Ultimate Pictures], the majority of which involved simple sequences of the rocket flying composited onto plate photography.

2. The core shot of this composition from *Hornblower* features Hornblower and Buckland looking from the stern of the Renown towards its bow. A green screen hides the point where the ship set runs out. A full scale Renown set was built but only for half of the ship. Because of this, all the scenes from midships to the stern were filmed, then the set was dismantled and rebuilt from midships to the bow. This image was defocused to match the mid-ground characters on the green screen plate. The shot on the right shows the final composition.



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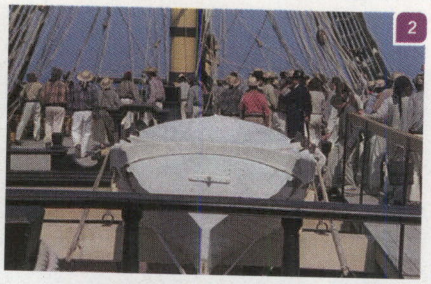
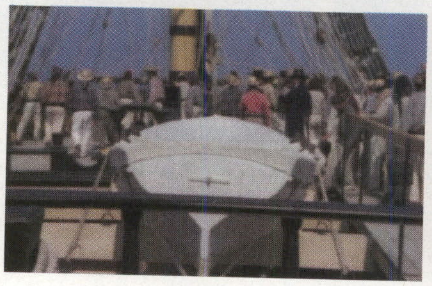
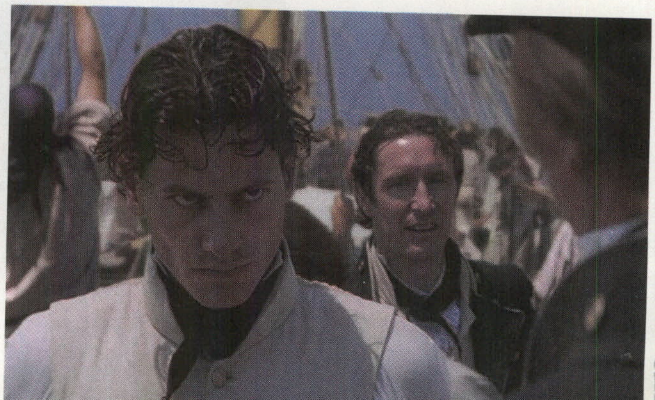
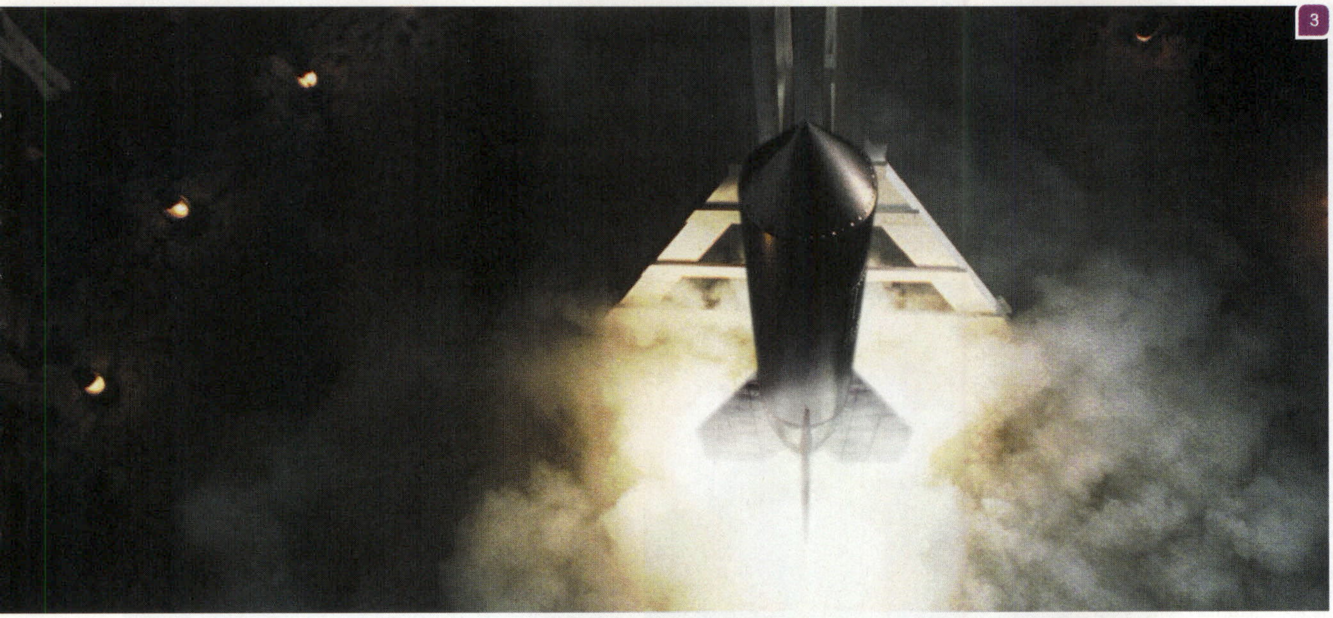








3. True to Men From Mars' philosophy of using live action where ever possible, the sequence of the rocket taking off in *The Rocket Post* consisted of three separate elements: a main live action plate; live action smoke effects; and the rocket movement shot against green screen.

Men from Mars

For many people, the phrase 'special effects' conjures up images of intergalactic battles. Not so for Simon Frame. *"Rarely are our effects the drama – the effects are there to add to the drama."*

"I am fairly happy not to do any big space numbers, I'll say that publicly," states Simon Frame, Head of Production at digital special effects house Men From Mars. Don't take this as a lack of ambition though. In the 16 months of its existence, the company has created around 1000 shots for TV and film productions ranging from the gritty battlefields of *Band of Brothers* to children's series *The Magician's House* and quirky comedy *Lucky Break*. It's also been nominated for a 2001 Emmy for its outstanding effects on *Hornblower*.

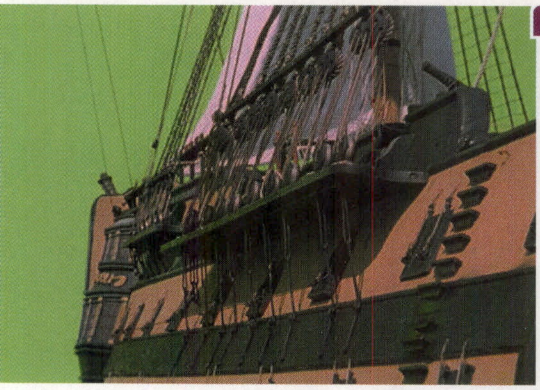
"Obviously I'd be delighted to work on any film but the truth is Men From Mars is good at photoreal effects," Frame continues. "Our market is people making drama. We understand drama – how effects should never upstage the story. We are happy to play that second fiddle role." But with high profile current projects including the two *Swiss Family Robinson* TV films, and forthcoming features such as Nick Willing's surreal *Dr Sleep*, *The Rocket Post* and *Crust*, that second fiddle is making plenty of noise.

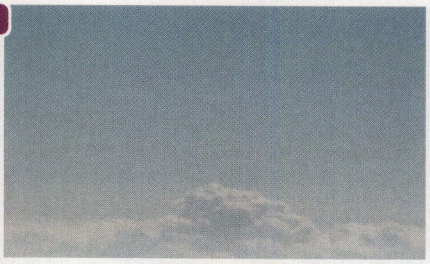
Established when Frame and Creative Director Phil Attfield decamped from Men in White Coats, Men From Mars has staked its reputation on the back of a high-quality, low-quantity work ethic. With nine staff and a handful of semi-attached freelancers, as Frame likes to point out, Men From Mars is a world away from the 'infinite number of rotoscoping monkeys' approach which seems to be so prevalent in the industry. "We have a different philosophy," he explains. "High-end workstations and a low number of very good people. That's the model of our company."

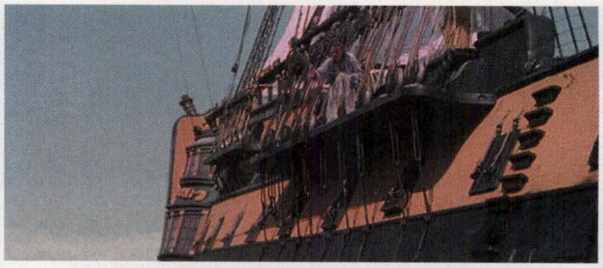
It also brings what could be described as an organic approach to effects. "We did a shot recently where fire had to go up some steps," reveals Attfield. "Obviously those flames could be created digitally but what you really want is the motion of the fire moving up the steps. I made a balsa wood former, painted it black and set fire to it with lighter fluid. We got the flames and the motion and it didn't take three days messing around on a Mac, only for someone to say, 'That bit's not quite right!'.

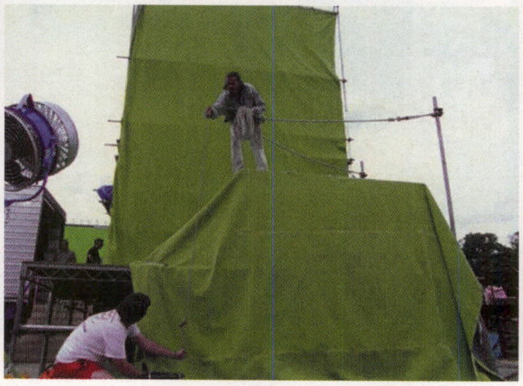
"You know if you tell art directors something has been made digitally, they'll say, 'Oh I can tell'," deadpans Attfield. "It's often nonsense because I might be lying to them. Equally you can have real elements and they think it's digital. People have become mistrustful of effects." Despite the joke, his message is clear. What is crucial for Men From Mars' effects is the end result, not the process.

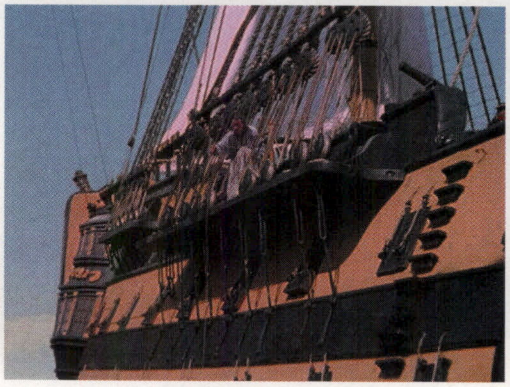
Not that this means the company doesn't pay attention to the process. The majority of its effects involve compositing green screen work with live action, so getting the best ingredients is crucial. ➤



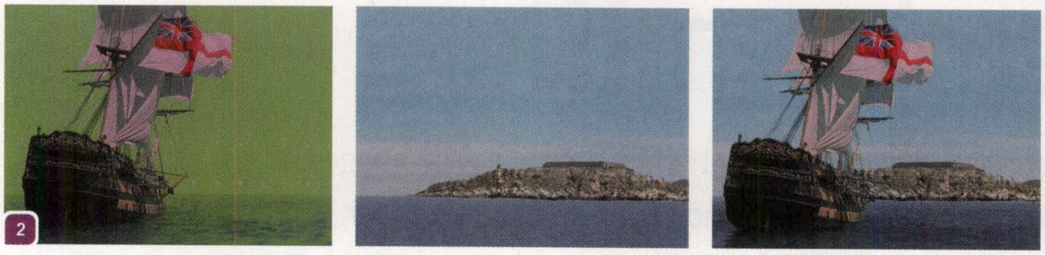








1. The above green screen shot for *Hornblower* is of the Renown model, which was the foundation around which other elements were constructed. A distant horizon was created which had the effect of softening the sharp horizon of the model tank photography. The actor playing Styles was filmed on a green screen set and matted onto the model. The sequence starts with a shot of the lead-line splashing into the water before the camera tilts up to reveal the side of the Renown and Styles standing precariously on the side of the ship. The rope consists of three parts: real rope in the actor's hand; the digital rope; and live action lead weight hitting the water and creating the splash.



2. This shot of the Renown model was a pan. The camera movement was digitally copied to create the pan on the digital matte painting of the background. Semana Bay was a digital matte painting which consisted of around 150 different elements including rock, hills, the port fortifications, ships and the sky. The final composition on the left combines the green screen model, the digital matte painting and a digitally generated sea.

"We're generally involved way before pre-production," says Frame. "We discuss techniques, how the team want to shoot, what any problems might be. For example, a specific sequence in *Hornblower* which showed a boat coming into a defended harbour had to be storyboarded by us because there was no boat, no castles and no guns. Then you get a shooting list together so production know what they have to shoot." Men From Mars staff supervise all the shooting that will later be incorporated into the special effects. It currently has someone in glamorous Newcastle on location for the new series of *Auf Weidersehen, Pet*. "When productions go away and shoot stuff on their own, they invariably get it wrong. It can be made to work but only with a lot of sweat later, in which case my budget has to go up," laughs Frame, shaking his head. "Generally, none of the crew making the film has any idea about what we need. They think we have a button for everything." Sadly, it's not the case. "All software packages have their pros and cons," adds Attfield. "You often hear a lot of nonsense; 'We must have *Shake* because...' Nothing against *Shake* but at one point it was the new kid on the block but so what? It's a compositing package. I'm less interested in the interface than I am in the functionality, but principally I am interested in the artist."

Just for the record, Men From Mars runs dual-G4s with a couple of ICE accelerator boards and uses *Photoshop, After Effects, Commotion* and *Cinema 4D*. Its plug-in library includes *Cinelook, Composite Wizard* and *Primatte Keyer*. Frame and Attfield are excited about getting their hands on 2d3's camera tracker software *boujou* though. "We're on the beta site for *After Effects 5.5* so we can try out *boujou* and provide some feedback," explains Attfield. "We don't actually need it at the moment, but there is a future job that I think it will be very useful for."

It will only be another tool in the armoury however, not a silver bullet, as Men From Mars continues its low profile progress through the world of digital special effects. "Personally I don't like effects that point to themselves," Frame ends. "Some of the effects in *Gladiator* were good but some were ladled on too much. It's very difficult to find a middle balance but that's what we try to do." ca>s

Contact Men from Mars on **[t]** 020 8280 9000 **[e]** info@men-from-mars.com **[w]** www.men-from-mars.com

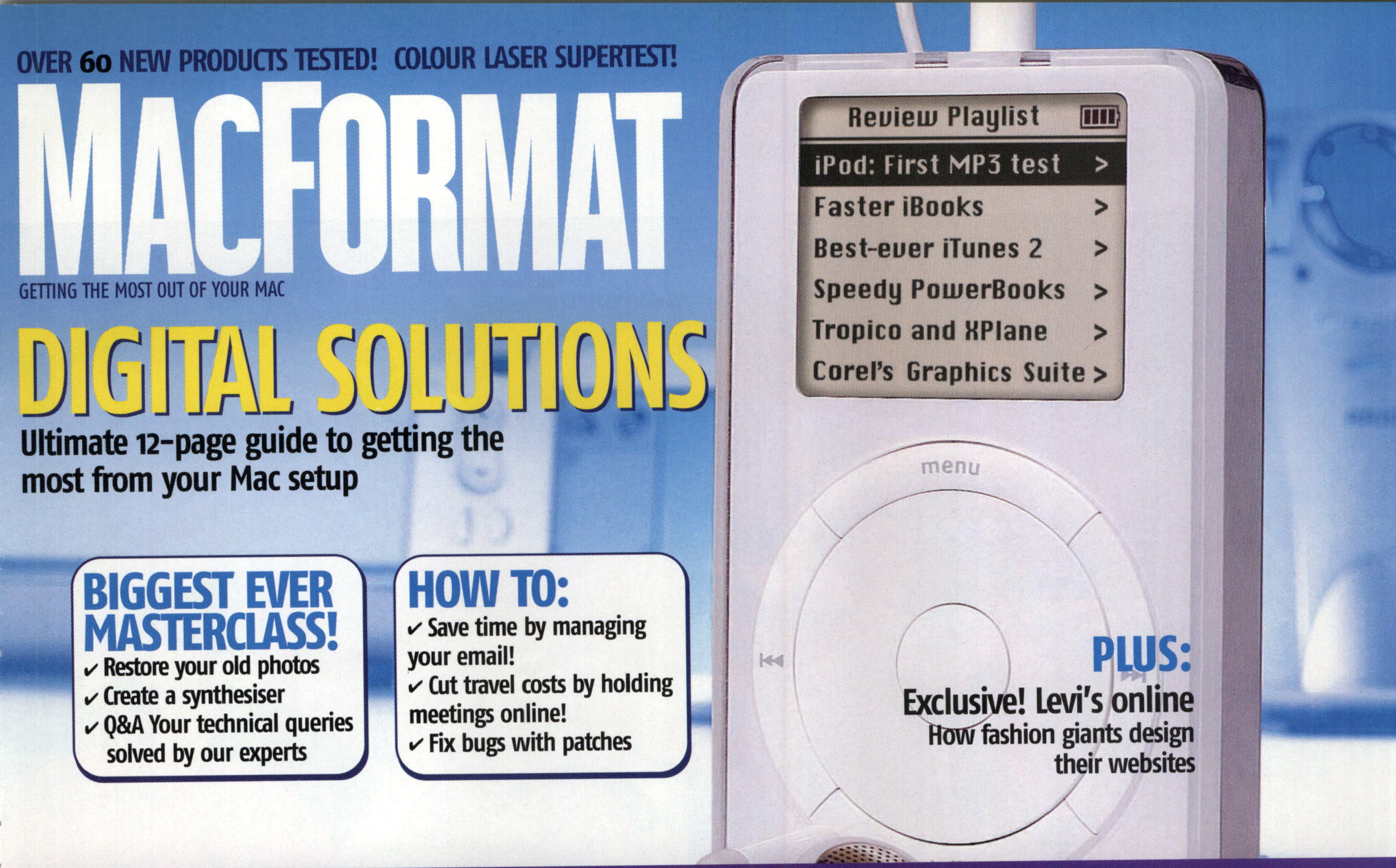
High-end muscle

While it uses dual-G4s, Men From Mars also relies on a secret weapon, the Quantel Domino

Central to the company's approach to digital special effects is Quantel's Domino digital optical film hardware. "It's a typical Quantel piece of gear," Simon Frame points out. "It has a 35mm film scanner, workstation, monitors and the recording facility back out to film, and is a closed loop system so you know what you're scanning in and what you're getting out."

Phil Attfield concurs. "We could have set up with more Macs or got a Discreet workstation in and used *combustion* throughout, but it would have cost about the same on Domino and we wouldn't have had the I/O [input/output] integrity," he says. "We always thought we needed that quality control over what we were doing and the Domino was a system that we knew well and had the expertise to run."

Although designed for film work it has proved invaluable for TV work too. "*Hornblower* was done on the Domino. We were trying to get these ships with rigging and fine detail off green screen," Frame says. "The Domino's keying is extremely good. It's better than any other plug-ins or formats on the market."



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Shrink to fit

Whether you're creating Lilliputians or hobbits, you'll need to use the oldest tricks in the book, and a few new ones

Since film was invented, directors have been shrinking humans to various sizes. The pinnacle of these efforts is Peter Jackson's *The Lord of the Rings*, in which ordinary humans were shrunk to three foot six, seamlessly interacting with their taller counterparts. A lot of the time (if the feet weren't showing), they simply stood one actor on a box. In other cases, they used forced perspective (with one person standing further back from the camera, on a specially built, distorted set). These tricks have been around forever. More complex, and more effective, however, are the blue screen shots, where the actors are shrunk to fit by computer.

Whether you want to recreate hobbits or shrink people to the size of a pin, the technique is virtually the same. You'll need to shoot against a blue screen, then use some nifty *After Effects* plug-ins to get the desired result. Install the *After Effects* demo on the CD, then install *Primatte Keyer* and *Composite Wizard*.

Although the tutorial looks complex, the technique is simple, and a professional composite can be achieved in minutes, even with MiniDV footage. To make your first attempt easy, we've provided sample scenes. ➤

The full version of Adobe *After Effects 5* costs £616.88, upgrade £182.13 and is available from **[w]** www.adobe.co.uk. The full versions of *Primatte Keyer* and *Composite Wizard* are available from **[w]** www.pinnaclesys.com

Files on disc
Tutorial files are on the CD in the Tutorial\Little folder.

Part 1: Keying out

Before you think about shrinking, you need to key out the blue screen and clean up the matte

On the CD

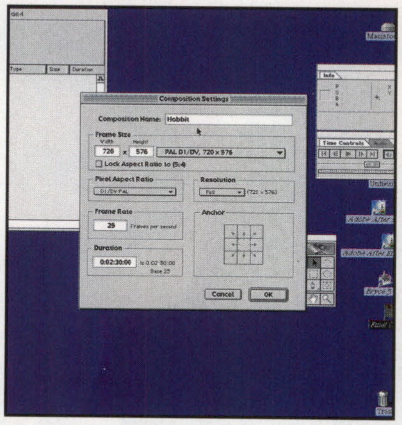
GrassBG.mov: The outdoor location with full-size human
Bluescreen.mov: Our hobbit, shot against bluescreen
FinalHobbit.mov: The end result you're aiming to replicate
Light.jpg: An image used for light-wrapping
Walking.mov: A second bluescreen clip
Camera.mov: A second location, this time smaller
Shrunken.mov: Our second end-result movie

Greenscreens

Green screens work as well as blue, and are often chosen when blue clothing or blue eyes are present. Also, if there's any daylight at all in your studio, you must use a green screen, because daylight registers as blue in camera. If you matte out blue when daylight is present, half your subject will vanish. Any colour of screen can be used, but blue and green are a long way from average skin tones, and most software has been developed with blue and green as defaults.

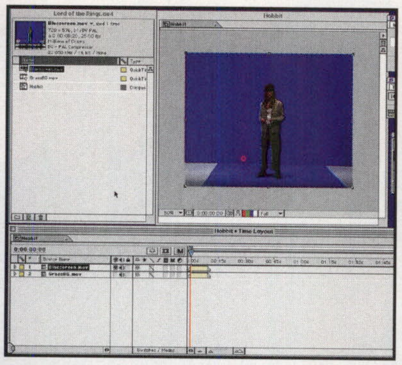
Lens distortion

When shooting for size reduction, directors worry about perspective and lens distortion. You should use the same tripod height and angle for background and foreground, but lens selection and distance from subject are less important than many suppose. Cropping and matting cancel most perspective problems. Very short lenses can create problems, so always run a test shoot. If it looks right, it is right, and you can forget the maths.

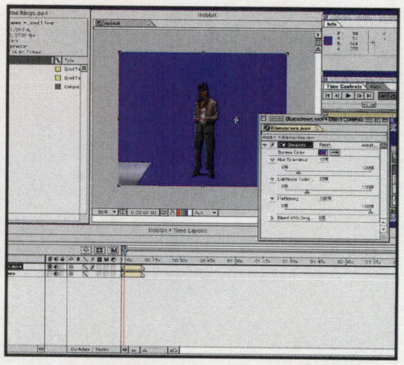


Composition Settings
Composition Name: Hobbit
Frame Size
Width 720 x Height 576 PAL D1/DV, 720 x 576
☐ Lock Aspect Ratio to (5:4)
Pixel Aspect Ratio: D1/DV PAL
Resolution: Full (720 x 576)
Frame Rate: 25 Frames per second
Duration: 0:02:30:00 is 0:02:30:00 Base 25

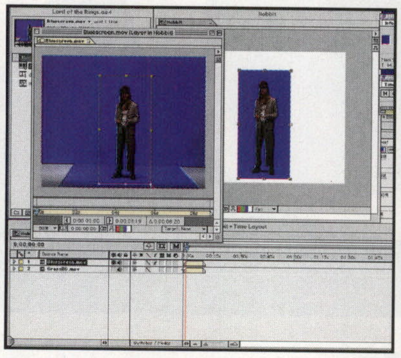
1 In *After Effects*, create a New Project called Lord of The Rings. From the Composition menu create a New Comp called Hobbit. Set for PAL DV (720x576), with a frame rate of 25.



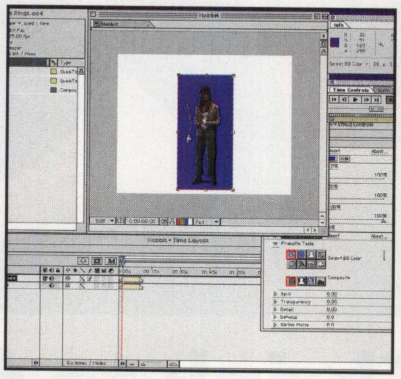
2 From the File menu, Import Bluescreen.mov and GrassBG.mov on the CD. Drag them to the Timeline, with the blue screen hobbit above the grass background. Switch off the background layer, by clicking the eye image next to the title GrassBG.layer. Check your progress as you work by switching this on and off.



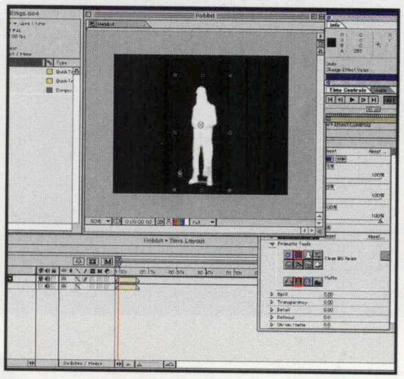
3 Many of the filters we use are in *Composite Wizard*, found in the Effects menu, and written as CW. So, select the Hobbit layer, and Apply CW Smooth Screen. Use the Eyedropper to click on a flat, well-lit blue area. This filter works very well with bad blue screen set-ups, but even helps with this footage.



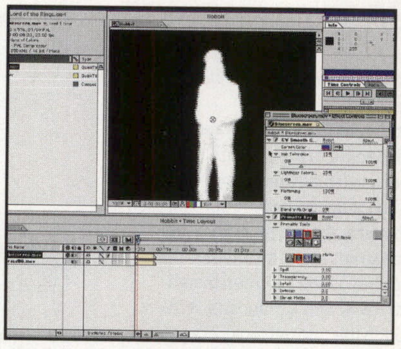
4 To mask out the non-blue areas of floor, and the poorly-lit edge, create a mask. Double-click the blue screen image, creating a new Layer window. Select the rectangle from the Tools window, and drag a rectangle over the hobbit, watching your progress in the main window. Close the Layer window.



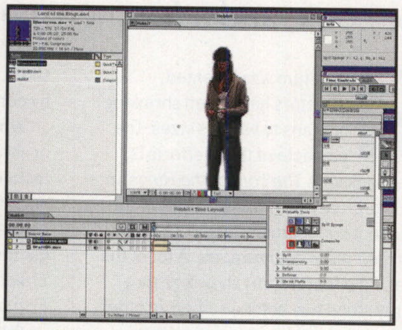
5 Select CW *Primatte Keyer*. In the Effects Controls window, click the top-left Primatte tool – it looks like a blue star. The words Select BG Colour appear on the right. Drag the mouse over the blue to key it out, including the wall shadows, but avoiding the foot shadows.



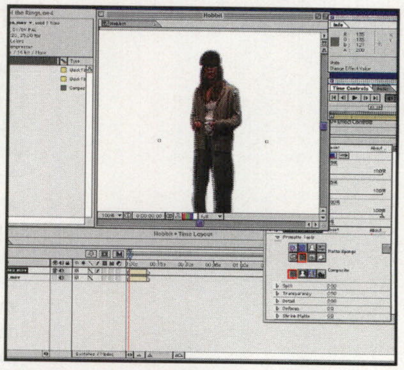
6 In the second Tools palette, below, switch from Composite view to Matte. In the Tools palette, select Clean BG Noise. Roll or click the mouse on areas of blue (shown black in Matte view), that are grey or dirty. Don't click near the hobbit at this point.



7 Still in Matte view, switch to the next tool along, Clean FG Noise. Now look for dirty or noisy areas in the white area of the hobbit. Roll the mouse over these areas and watch them vanish. Again, keep away from the edges, because other tools will be used to clean them up.



8 Click Composite view, and select the Spill Sponge tool. Click, rather than roll, on blue areas around the hobbits. Switch between Composite and Matte view, if this helps, as you mop up the blue. Don't destroy edges in your attempts to eradicate all blue because we can suppress the blue later.



9 Sometimes, pixels in the foreground become transparent, so you can use the Matte Sponge to eradicate them. In Matte view, select the Matte Sponge tool, and click on grey areas in the white, to clean them away.

Part 2: Clean it up

This matte would have been good enough for movies ten years ago. To get a truly realistic, modern look, you'll need to clean up that image

Blue screen lighting

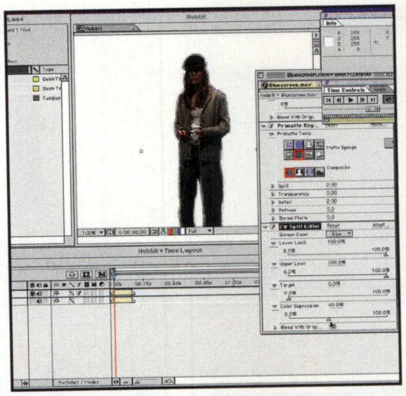
Lighting for blue screen is an art. You can hang up a few blue sheets, shine a lamp and hope for the best, but it makes it easy on the software if you light the screen without shadows or wrinkles. Keep as much blue as possible off the subject. Rim lighting, which puts an edge around the actor from behind, makes the matt tight and clear.

Background elements

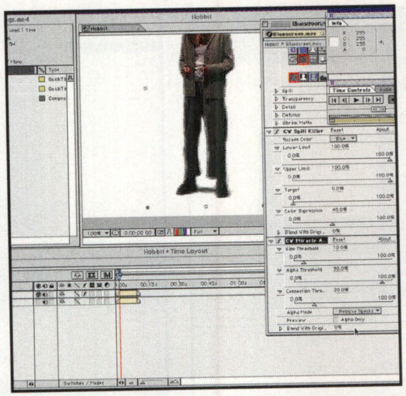
Shoot the background element first, so you know the lighting conditions you want to recreate in your studio. Brightness and contrast can be controlled in *After Effects*, but the closer you are to begin with, the better the end result will be. Light direction and angle must be the same in both elements, or the end result will be unrealistic, no matter how good your composite.

In the details

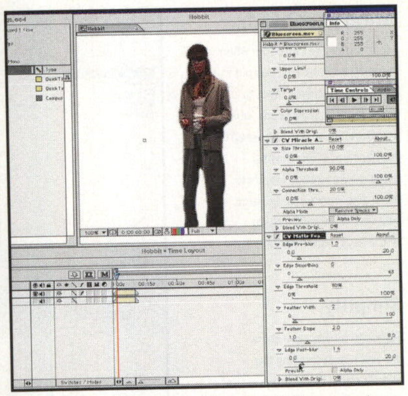
Attention to detail is vital in composite work. The interlayer blurring, for example, may seem like a considerable effort for an effect that is invisible on a frame by frame basis. It is this attention to detail that makes composites believable. A composite should be so perfect that it looks like you used Little People as actors, rather than created an effect.



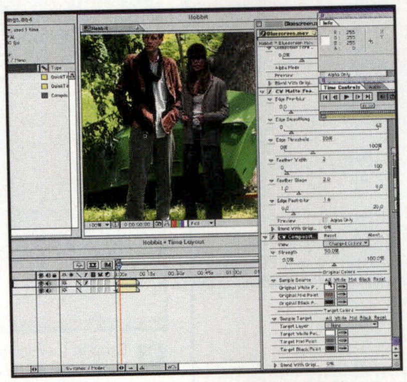
1 Apply CW Spill Killer, and switch from the default Green to Blue. You'll notice that the edges of the hobbit turn a yellow-green colour. To tone this down, drag the Colour Suppression slider to 40 per cent. Any blue spill will vanish and the colours should appear normal.



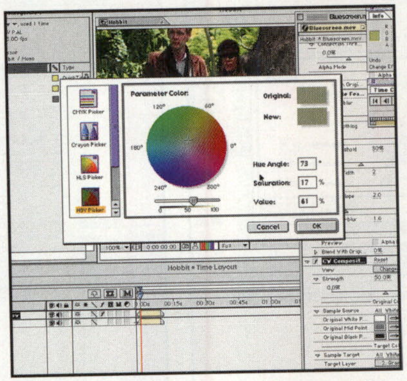
2 Apply CW Miracle Alpha Cleaner, to get rid of any dirty areas in the transparent Alpha area of your image. The sample provided has been shot, masked and matted well, so there may be almost no difference. If you had a less-than-perfect screen or camera, this tool would be essential.



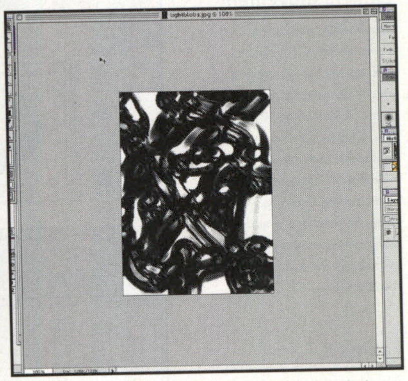
3 Apply CW Matte Feather to take jagged edges away from the hobbit by smoothing them, and adding a feather of transparency. Set Edge Threshold at 30 per cent, with Edge Smoothing at 5, and Feather Width at 2. The Blur tools should be set between 1 and 2.



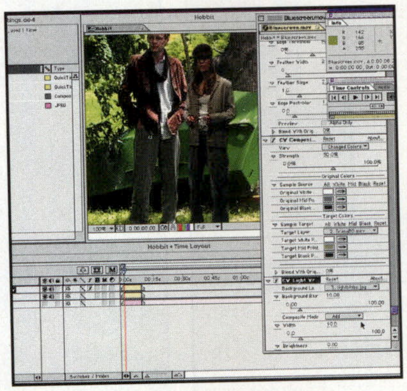
4 To match the colour of your hobbit with the grassy background light, select CW Composite Colour Matcher. Click All in the Sample Source list. This reads the average colours of the hobbit layer. With this particular clip, no further adjustments are required.



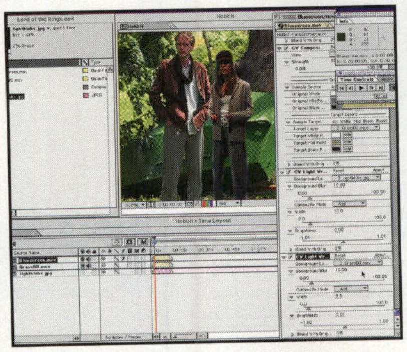
5 Set the Target layer to GrassBG.mov, and click All to read the average colours of the background. The hobbit changes, but doesn't quite match, so click on the Mid-point swatch, and set: Hue 73, Saturation 17 and Value 61. The hobbit now blends into the scene.



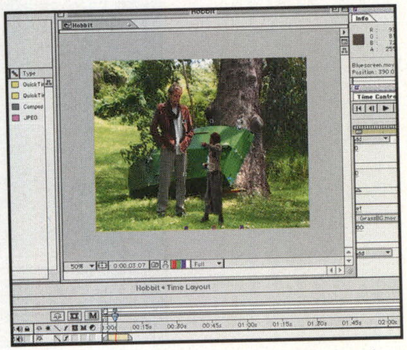
6 The human in the background has dappled light on his body. To emulate this for the hobbit, create a mix of blobs in *Photoshop* and save as Light.jpg (a sample is provided on the CD). Simple blobs and the Chrome filter, work well. Import the result into your project.



7 Select CW Light Wrap, and choose Light.jpg in Background Layer. Set Width and Blur to 10, and you'll see the dappled edges appear around the hobbit.



8 Again Select CW Light Wrap, this time selecting GrassBG.mov as the background layer. Reduce the width to about 5. This adds a slightly backlit look, which helps to blend the hobbit with the outside world.



9 Click on the hobbit image, then click-drag the corner of the box to shrink the image. Use Shift to avoid distortion. You may find, however, that slight widening helps with the overall look. Position the feet slightly in front of the human, to help with the illusion. ➤

Part 3: Film quality blurring

To achieve the best possible matte, the edge of the hobbit should blur in the foreground and background. A few steps will give you a perfect interlayer blur

Mind your head

Head shrinkage can occur when creating hobbit-sized people. That is, by shrinking them to three foot six, their heads look unnaturally narrow, compared to human heads. This may be because we expect hobbits to have disproportionately large heads. To cure this, a slight widthways stretch helps.

Simplify

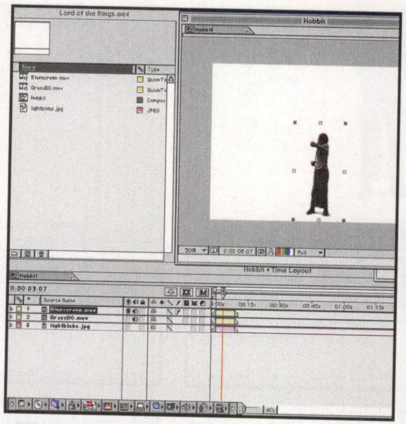
Although blue screen shots are brilliant at showing the overall effect of size contrast, try to keep them to the minimum. If *Lord of The Rings* used actors standing on boxes, so can you. Simplify, and use the effect only when required.

Camera movement

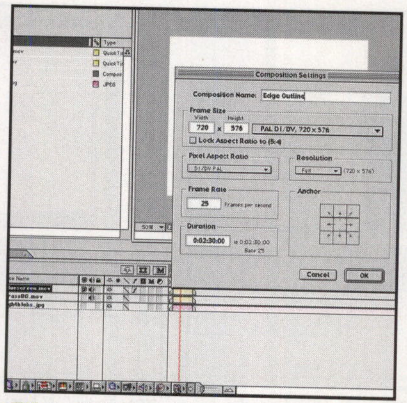
If you want to build camera movement into a miniaturisation shot, you will have a huge task on your hands, needing motion control equipment and the *After Effects* production bundle. To get around this, use camera movement on close-ups, and when shooting box shots. When well edited, it gives the impression of camera movement, even though there was none in the effect shots.

Faking it

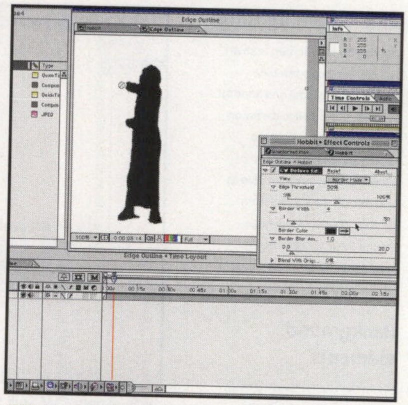
A fake camera movement can be created by enlarging your frame slightly, and shifting the whole frame during the sequence. This can look quite fake without any lens distortion, but it has been used to good effect in movies such as *Star Wars: Episode I*. Keep it brief.



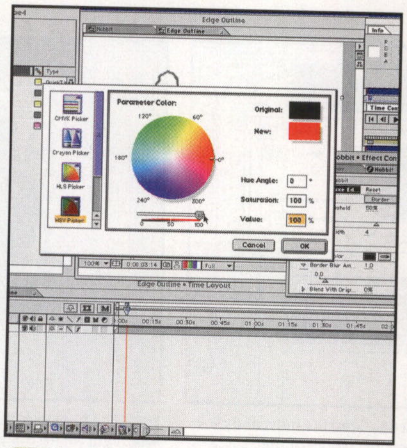
1 In the Hobbit composition, turn off the grass layer, leaving only your adjusted blue screen image of the hobbit.



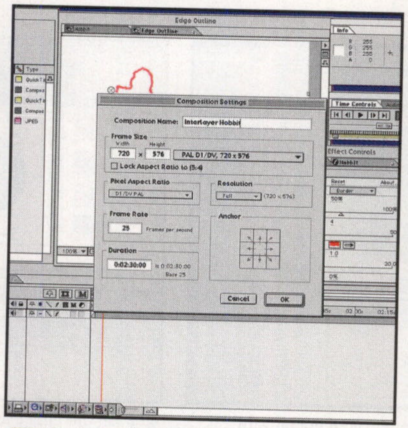
2 Create a New Composition, with the same values as before, called Edge Outline. This will be used to create a control layer in the shape of the hobbit's edge, to blur between the layers.



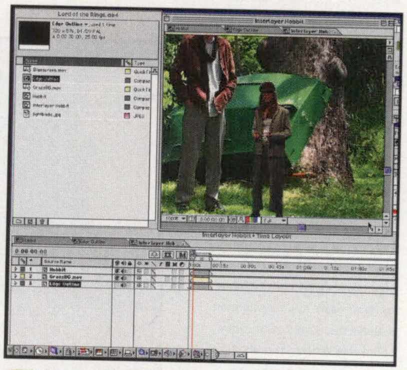
3 Drop the Hobbit composition into the Timeline, and Apply CW Deluxe Edge Finder. Set View to Border. The default swatch may be white, meaning that no border is visible at this stage.



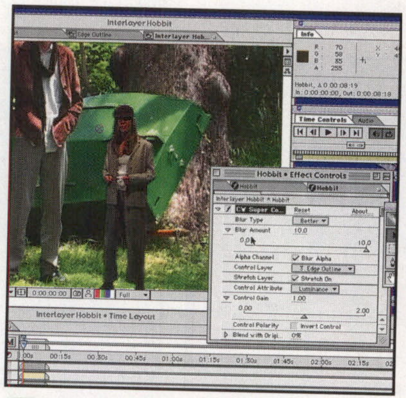
4 Now using the swatch, set the Border Colour to Red.



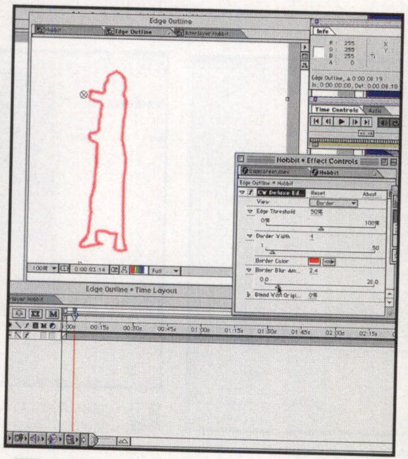
5 Create another New Composition called Interlayered Hobbit, where everything will be brought together.



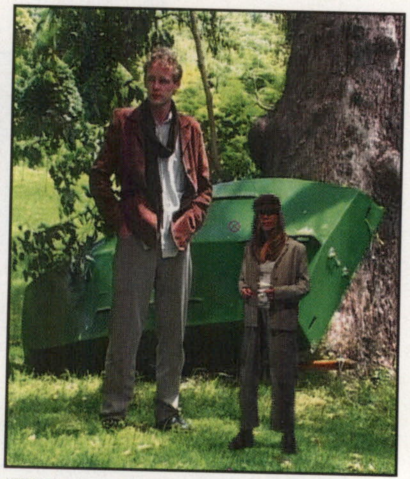
6 Drop in the Hobbit composition, the GrassBG.mov, and the Edge Layer composition. Make sure you turned off the GrassBG.mov visibility in the Hobbit comp earlier. Turn the Edge Layer visibility off, by clicking the eye image.



7 Select the Hobbit comp in the Timeline, and apply CW Super Compound Blur. In the Effects Control window, Set the Super Compound Blur Control Layer to Edge Layer, and Blur Amount to 10. The effect will barely be noticeable without movement, but it makes a huge difference.



8 Double-click on Edge Layer, and adjust the width and blurring if required, to get a good level of interlayer blur.



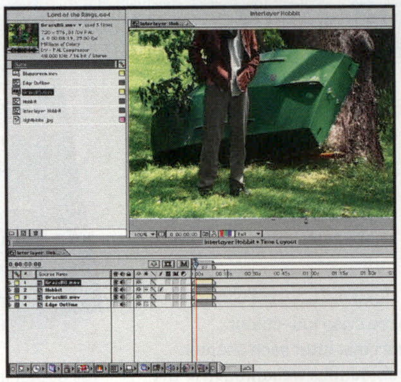
9 The basic composite is now complete and ready to be output.

Part 4: Grassy feet

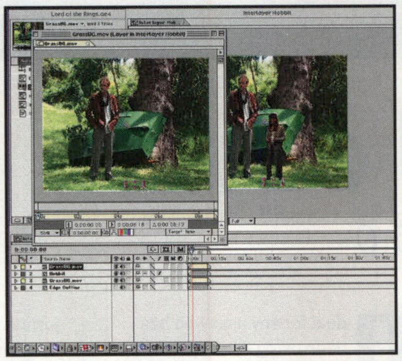
Some foot shadows were used to help add weight to the hobbit, but if you want to add depth, you'll need a bit of grass over the hobbit's feet

Count down

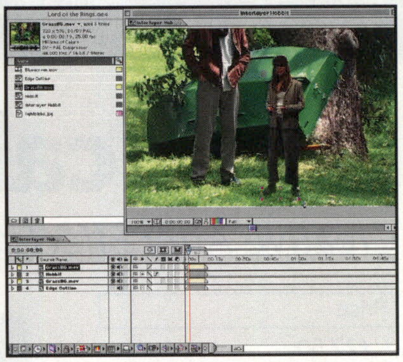
When shrinking people to very small size, you don't need to create any sets, but can use real-life objects, shot close up. For interaction with these objects, such as climbing over a matchbox, you will need to do some maths, setting a standard scale. So, if your actor is one-tenth of his real size, create a blue box scaled up 10 times.



1 Drag another copy of the GrassBG.mov to the Timeline, making sure it is the top layer.



2 Double-click the image to create a new window, and use the Rectangle tool to drag a small mask where the hobbit's feet will be.



3 In the Layer menu, select Mask and set Opacity to 50 per cent, and Feather to 30 pixels. Check the end result and output.

Part 5: Super shrinking

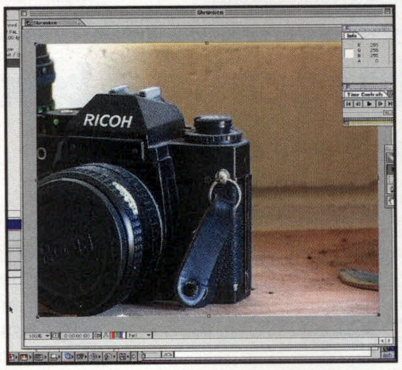
If you want to make tiny people, rather than hobbits, a few slight changes will be required

Conflict of scale

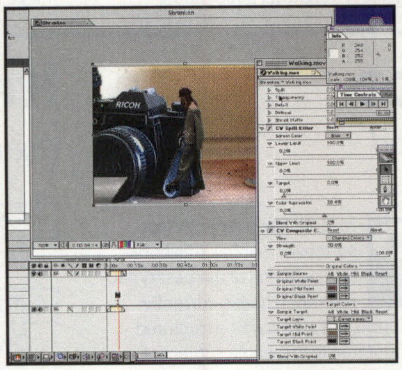
A common mistake in miniaturisation is conflict of scale. In one shot, the actor may be the size of a teacup, in the next, the size of a match. Viewers spot this a mile off, so create a model of your actor (or just a ruler to the same height), and use this when setting up shots.

Follow the thread

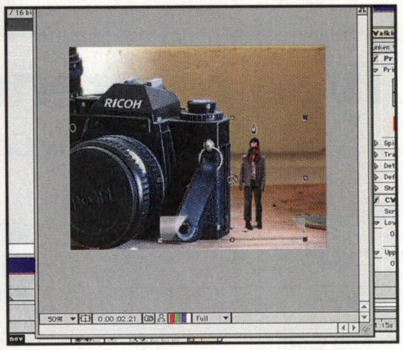
Some actors can naturally focus on empty space, where a smaller person will later be placed. Other actors look like they're staring into the distance, which is wholly unconvincing. If an actor is struggling, dangle a thread of cotton in front of them as something to focus on. Shoot so the cotton is out of focus, or use software to remove it. Ideally, shoot the main actor on blue screen as well, use blue cotton, and simply matte it out before dropping both actors into a new background.



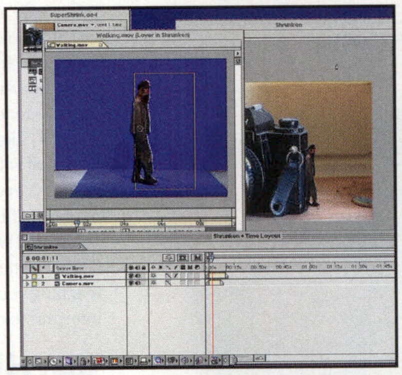
1 Create a New Composition called Shrunken, and Import Camera.mov and Walking.mov, dropping both into the Timeline.



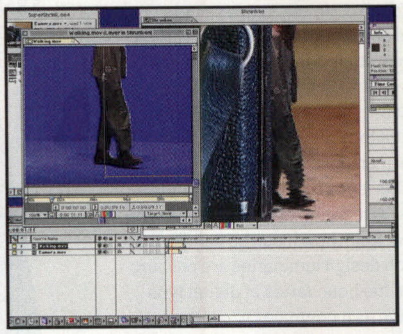
2 Apple the same process as before to the blue screen layer, until you have a good composite.



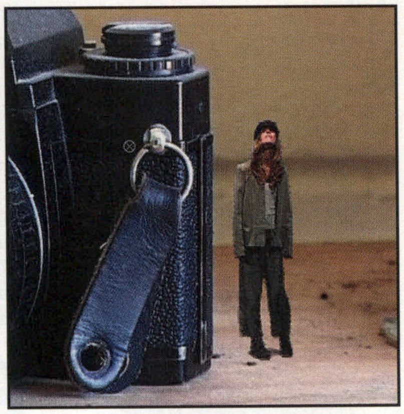
3 Select the Walking.mov clip, and drag it to a smaller size. Position her so that she appears to be a short distance behind the camera, or she may appear to walk into it.



4 Double-click the Walking.mov, to create a new window, and use the Rectangle tool to draw a mask over the hobbit. The left edge should line up with the camera edge.



5 Click and drag the points of the box to refine the edge. In this example, the edge of the camera is white, and it works better to bring the mask further left, into the black area. Set Mask to Best. Feathering can help, but in this example, it doesn't.



6 Finally, check that you're satisfied with the final effect, and then output. ca•s

Reviews [Books]

Practical course

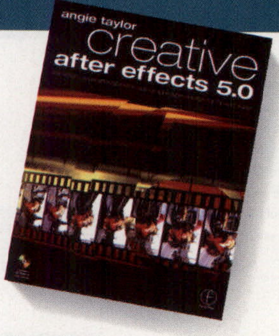
Creative After Effects 5.0

Price	£27.50
Author	Angie Taylor
Publisher	Focal Press
ISBN	0240516222

Ideal for any user who has been using *After Effects* for some time but wants to formalise their skills, this is very much a hands-on, tutorial-based manual. The author recommends approaching the book in a linear way, as skills are built one step at a time, with each tutorial incorporating the previous lesson's skills.

As you would expect from the Focal Press, this is a well-presented book with heavyweight art paper doing justice to the crisp full-colour screenshots that litter each chapter. After the ubiquitous walkthrough of the program's user interface, the learning begins in earnest with chapters on how to import footage and set-up *After Effects* to suit yourself.

The 16 chapters move from masks, nesting and animation through to 3D and type manipulation. Owners of the Production Bundle will appreciate chapter 12 which talks about using the image tracking features on offer.



The author is an expert and does at times take some things for granted. You may want to re-read several chapters and practice your skills before moving on. That said, this is still an excellent practical course.

Verdict
★★★★★

Type reference

Making Digital Type Look Good

Price	£19.95
Author	Rob Gordon
Publisher	Thames & Hudson
ISBN	0500283133

Presented as a large format softcover manual, this book isn't only one of the best type reference books currently available, but also a well-structured introduction to the whole subject of typesetting for intermediate and advanced users.

Part one begins with a useful history of digital typography itself, then moves on to the comprehensive sample of type specimens set in a wide variety of formats that is the heart of the book. The concluding section looks closely at display type on the printed page and in digital form, as well as the available type manipulation software.

This isn't a tutorial-based manual but a distillation of where digital type came from, how it can be handled, and which design luminaries are pushing back the boundaries of digital type design as it continues to evolve.

Verdict
★★★⯪☆

Interpreting textures

Digital Texturing and Painting

Price	£42.99
Author	Owen Demers
Publisher	New Riders
ISBN	0735709181

The perfect companion to *Digital Lighting and Rendering*, this book suggests ways to look at any object and see the texture that makes it what it is. It then points out the tools which make it possible to recreate that texture digitally. The opening chapter, for example, discusses how to dissect a scene's textures and see them for what they really are.

This book doesn't teach software technique but instead, how to gather reference material, colour theory and prepare for each project. As the author states, "I like to think of this book as a tutor that will help you develop the software in your head." This full-colour manual is filled with high res images supported with well-written text.

Where this book excels is in teaching you how to look at and then interpret textural patterns.

Verdict
★★★☆☆

The business

Digital Compositing In Depth

Price
£34.99

Author
Doug Kelly

Publisher
Coriolis

ISBN
1576104311

This excellent manual offers a complete course for anyone who wants to become a digital compositor. It not only covers practical technique, but also looks closely at 'the business' itself and how you can gain an advantage when pursuing your first or next job.

The book is divided into 19 chapters that take a look at how compositing fits within the industry as a whole and which other disciplines impact on the role, then moves on to actual hands-on project work.

All skill levels will benefit from the real-world examples and project work that makes up the vast majority of this book. Demo versions of the software in use, as well as project files, are included on the two accompanying CD ROMs, although there does seem to be a bias towards *Digital Fusion*.

Overall, the book is a dense read, with each chapter being packed with technical information, case studies and tutorials. The vast majority of the accompanying illustrations are in black and white and unfortunately, not of a sufficiently high quality to do them justice. Thankfully there is a full colour section that duplicates most of these images.

If you are involved in film or video post-production in any shape or form, you owe it to yourself to read this book cover to cover.

Verdict
★★★★★

The art of realism

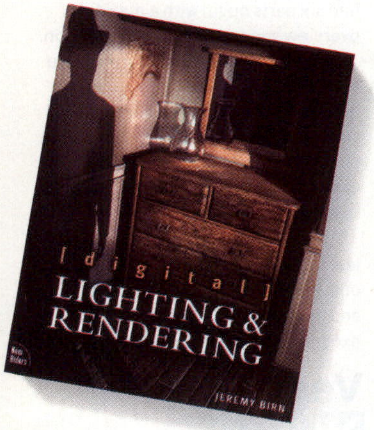
Digital Lighting and Rendering

Price
£38.99

Author
Jeremy Birn

Publisher
New Riders

ISBN
1562059548



This book takes a look at the sciences of the fine artist and cinematographer who blend light to create their scenes and transfers these technique to the digital realm where these same skills breathe life into digitally-created 3D scenes. George Maestri describes this book as, "The definitive text on lighting for computer graphics. It's an excellent resource for anyone creating 3D content."

You begin by learning the basic three-point lighting rig and later chapters build on this basic knowledge covering colour, shadow and exposure in-depth.

Later chapters apply these skills to the 3D rendering process, enabling you to push the realism of your scenes to new heights and include live footage. This is also an intensely practical book with packages such as *LightWave* and *Maya* coming under the spotlight.

Handling the lighting of a scene can make or break its realism. Read this book cover-to-cover and discover how to make your scenes spring to life.

Verdict
★★★★☆

Broadcast design

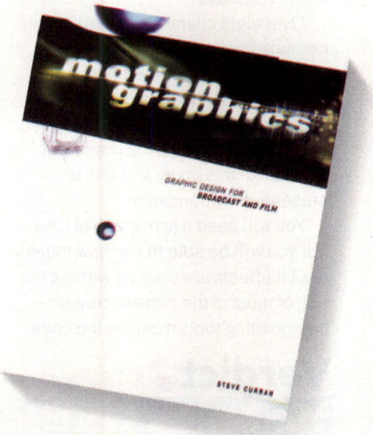
Motion Graphics

Price
£45.00 hardback
£30.00 paperback

Author
Steve Curran

Publisher
Rockport

ISBN
1564966461 HB
1564968383 PB



Make no mistake, this is a coffee table book for designers. Don't expect a how-to manual on motion graphics such as *Creating Motion Graphics with After Effects* (also reviewed here). This book is a celebration of the art of broadcast design, not a software manual.

Work by many of the industry's leading exponents is profiled, including 3 Ring Circus, Global Japan and Pittard Sullivan. Presented in full-colour, their best work is showcased via large high-resolution scans of key elements of the sequences featured. The main function of this book is to enable you to marvel at the aesthetic on offer – it also serves as a sort of buyers guide for the best in contemporary motion graphic design.

Some sequences you will know from recent motion pictures such as *Mission Impossible* and *Seven*, others you may not know at all. But what is certain is that you will pour over this book, perhaps for inspiration, but mainly for the pleasure of viewing the images on offer. ➤

Verdict
★★★★☆

After Effects

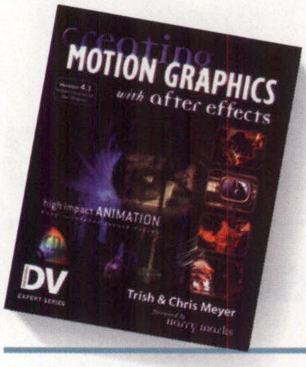
Creating Motion Graphics with After Effects

Price
£32.99

Authors
Trish & Chris Meyer

Publisher
McGraw Hill

ISBN
0879306068



Very much in the same vein as the Lynda Weinman series of books on Web graphics, this densely-constructed manual, which distills the author's *After Effects* course, can be used by single users and lecturers in equal measure. Owners of any of the *Wow!* series of books will instantly feel at home as this manual looks and feels very similar indeed. This book is a natural stepping stone from the *After Effects* manual, enabling users to push back the boundaries of their knowledge.

The Standard and Production Bundles are more than adequately covered, with information on how to incorporate *Photoshop* and *Illustrator* graphics in your own work.

Verdict
★★★★☆

Award-winning

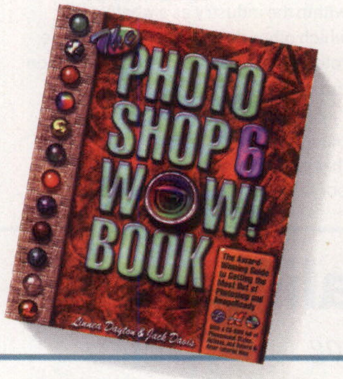
The Photoshop 6 Wow! Book

Price
£37.99

Authors
L Dayton & J Davis

Publisher
Peachpit Press

ISBN
0201722089



This latest edition to the *Wow!* series covers all of *Photoshop 6* and *ImageReady 3*'s new features. Readers who already have previous editions will welcome the awesome new features chapter alone, but the book isn't all gloss. There is useful information to be had here as well as gorgeous graphics.

The book begins with first principles and concludes with animated graphics for the Web, making this more than a simple reference manual. Tutorials are always supported with before and after images that are reproduced to the highest quality. Occasionally the text becomes too technical for the novice user, but that said, this is one of the most useful *PS* manuals available.

Verdict
★★★★☆

Coding techniques

Visual Special Effects Toolkit in C++

Price
£37.50

Author
Tim Wittenburg

Publisher
John Wiley

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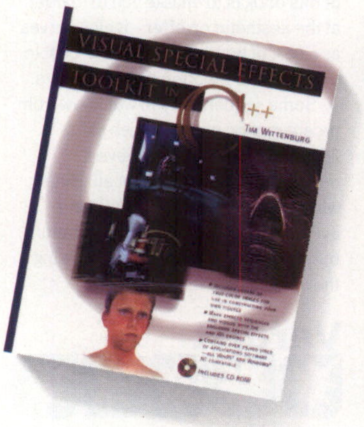
0471132209



Peel back the glossy veneer of the latest station ID on any digital TV channel and you'll see the underlying code that makes those images possible. If you want to delve deep into the code that generates today's 3D special effects, this book opens a door into a Pandora's box of C++ code and the *Image Compositing Toolkit 2.0* special effects package.

Over eight chapters, you will cover compositing, animation, texture mapping, blue screen effects, morphing and VRML. Don't expect the usual hand-on step-by-step tutorials. The code is the important element in this book, and this is presented in abundance.

You will need a firm grasp of C++ but you will be able to see how today's digital effects are created without the GUI of most of the current crop of compositing tools masking the code.

Verdict
★★★☆☆

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Jon McFarland &
Rob Polevoi

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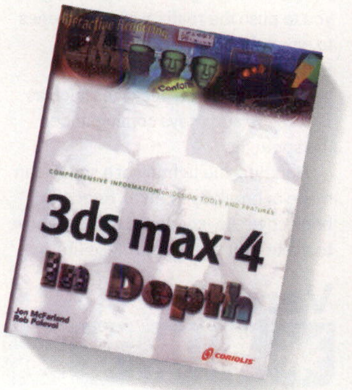

If you are new to *max 4*, this is an ideal manual to get you started because all the buttons and menus are meticulously explained as you move through each chapter. However, complete novices should beware of the level of proficiency needed to understand the explanations! The themed chapters which are divided into six parts begin with a *max 4* overview and conclude with animation.

Each explanation is comprehensive but lacks any real-world relationship between page and screen. The supporting screenshots and the overall page design could have been made easier on the eye – they also would have been much easier to follow.

This is a great book to delve into to learn a new skill, or brush-up on an old one. It's just a shame that the authors and designers didn't make it a more exciting learning tool.

Verdict
★★⯪☆☆

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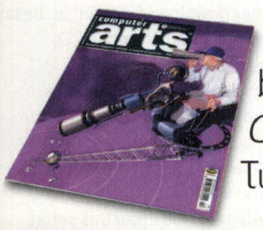

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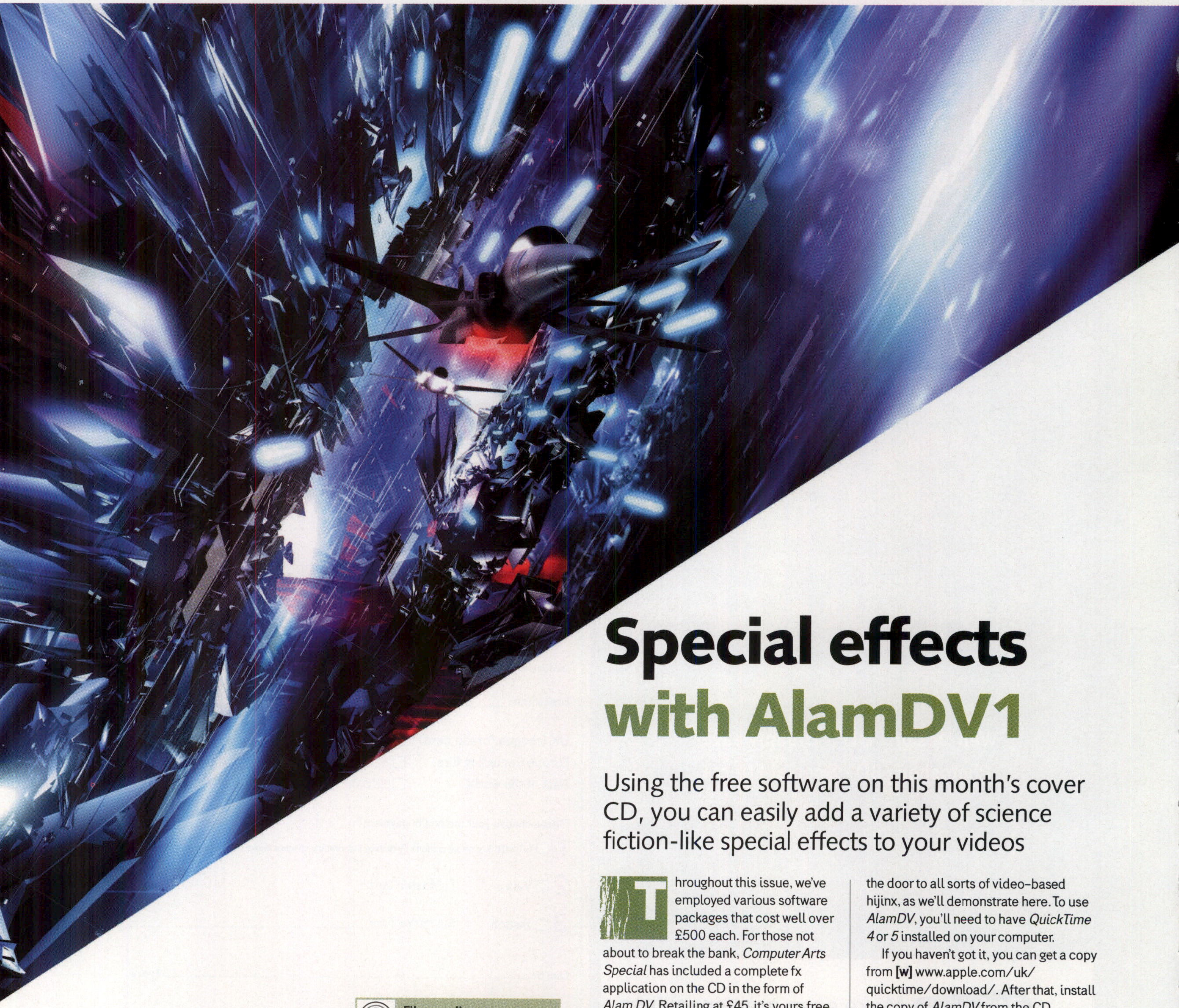


Special effects with AlamDV1

Using the free software on this month's cover CD, you can easily add a variety of science fiction-like special effects to your videos

Throughout this issue, we've employed various software packages that cost well over £500 each. For those not about to break the bank, *Computer Arts Special* has included a complete fx application on the CD in the form of *Alam DV*. Retailing at £45, it's yours free to use and keep. Beginners will find this a good place to start learning special effects, while pros can keep it handy for whenever it might be called for.

The application specialises in creating powerful, light-based special effects. Think lightsabres. Think phaser bolts. Think lightning flying from the eyeballs of wicked intergalactic folk. For those working on a tight budget, it opens the door to all sorts of video-based hijinx, as we'll demonstrate here. To use *AlamDV*, you'll need to have *QuickTime 4* or *5* installed on your computer.

If you haven't got it, you can get a copy from **[w]** www.apple.com/uk/quicktime/download/. After that, install the copy of *AlamDV* from the CD, following the instructions in our interface. Next, visit CSB Digital's Website at **[w]** www.csb-digital.com/alamdv/computerarts.php to register your copy and you'll get a serial number sent to you via email.

Run *AlamDV* and enter this serial number then quit the program, run the patch file included on the cover CD and you're ready to start.

Files on disc

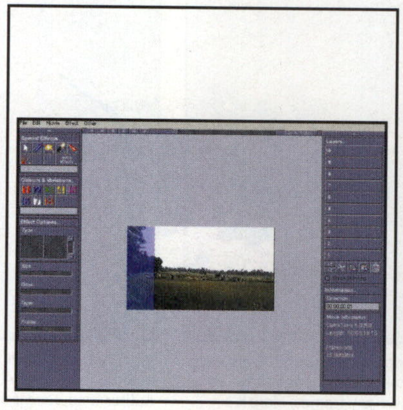
The full product of *AlamDV1* is on the cover CD. Please run the relevant patches as instructed in the CD interface before following the tutorial. The movie clip rice_fields.mov used in this tutorial has been included on the cover CD for use in recreating the special effects. These video images are copyright by Lee Fulmer and may not be redistributed, reproduced or sold. Expertise provided by Lee Fulmer, Creative Director of bang splat twiddle. **[e]** mail@leefulmer.com **[w]** www.leefulmer.com **[t]** 077 1106 6788

Part 1: Adding special effects to video footage

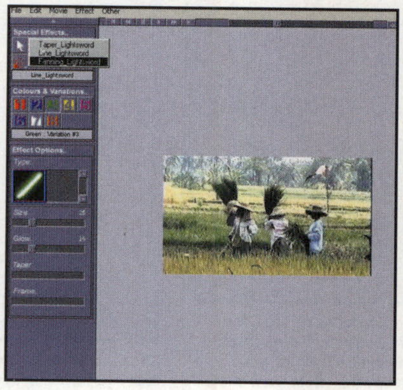
In this example, we're going to add a light sabre effect to spice up some video footage of Balinese women working in the rice fields

May the force be with you

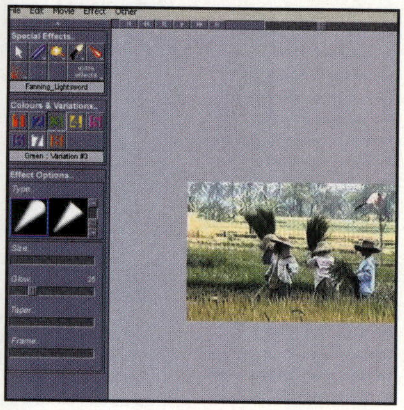
The *AlamDV* effect which seems to get used the most if you look at the sample movies on CSB's Website is the light sabre effect. The effect made famous by George Lucas in *Star Wars* was a painfully complex process involving drawing in the light sabres on a separate film for each individual frame of the movie and matting them together. Needless to say getting everything lined up and correct would have been a tedious process. With your copy of *AlamDV*, you can easily add these effects to any movie you want by drawing them straight on to your video.



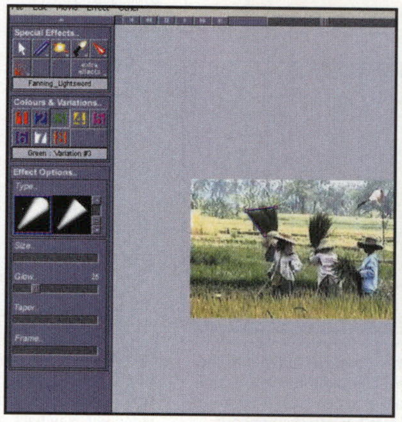
1 Start by opening the movie clip provided on the cover CD. Click the play button along the top of the workspace video to watch the clip. Although the clip has been well edited, it's bland so we're going to add a few effects to liven it up.



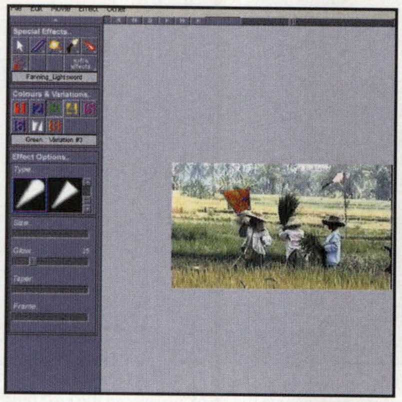
2 After watching the movie, we've decided to use the light sabre effect on the bales of straw. Start by selecting a frame about six seconds into the move, then click on the Light Sabre icon in the Tool palette and select Fanning_Lightsword.



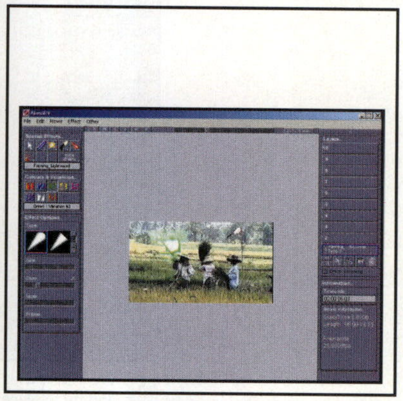
3 Next we've scrolled through the list of Lightswords on offer and picked one which is fuzzy around the edges and rounded on the end. This makes it easier to cover the hay bales more naturally than the more defined Lightswords.



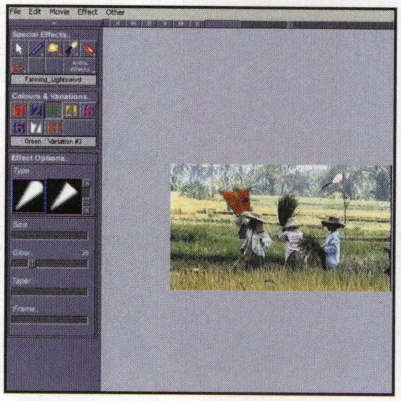
4 Having selected the Lightsword and a colour (green in this case), it's then a simple process of clicking a series of four points on the frame of the video to outline where the effect should take place.



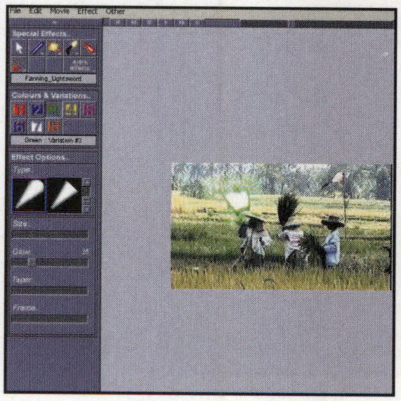
5 With four points drawn in, the effect appears as a box on top of the frame with anchor points and an arrow indicating the direction of travel. The effect hasn't been applied yet and we can adjust the settings without it having any effect.



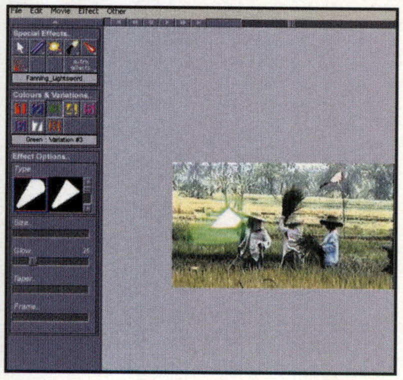
6 To see what the effect will look like, simply hit Return or Enter. The effect is now applied to the frame and appears on the Layer menu at the right. You'll see that the right-hand edge of the effect doesn't quite cover the hay bale.



7 To correct this, ensure that the layer with the Lightsword is highlighted in the Layer menu and hit Return or Enter again. This returns us to the Effect box where we can click and drag the points to change the shape and placement of the effect.



8 Once you're happy with the placement, hit Return or Enter again to apply the changes and see what the effect looks like now. It's important to always hit Return or Enter to apply your effect or you may lose your work.



9 To make the hay bale 'glow' as she threshes, we need to place the effect on several frames to either side of this one wherever the bale is visible. Use the arrows keys to move back and forth and draw the effect on these other frames. Here we've moved to frame 06.00. ➤

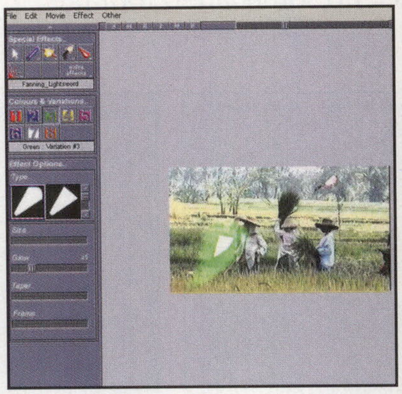
Upgrade offer

Very soon, *AlamDV2* is going to hit the market. In fact, it's already in beta testing, and promises users a new interface, tweening and easier effect manipulation. If you pre-order *AlamDV2* before the new version is released, CSB Digital will give you a discount of £10 off the £49.99 price tag. The expected release date is 15 December. Though this isn't set in stone, if you want to take advantage of the offer, hurry. If you miss out on the pre-order special for *Computer Arts* readers, CSB Digital will still offer you £5 off. To benefit from this upgrade offer, visit **[w]** www.csb-digital.com/alamdv/computerarts.php.

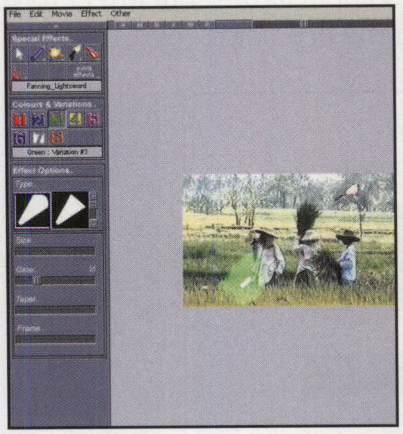
Part 1: Adding special effects to video footage continued

Applying special effects

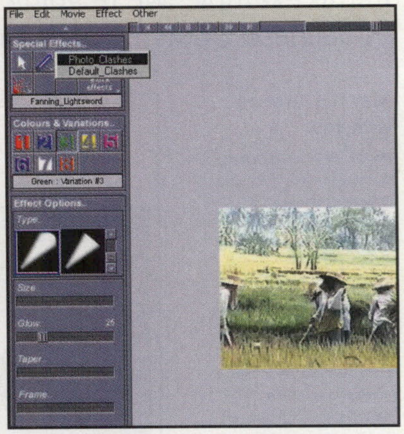
The way *AlamDV* works, you need to be sure that you apply your effect to the frame before you move on to the next one or you will lose it. This is handy if you've done something you don't like but can be a real pain if you forget and lose something good. The way to apply an effect is to hit the Return or Enter keys. When you do this, the effect switches from Edit mode (the box or line you've drawn) to Preview mode (which shows the effect on the frame) and adds it to the Layer menu. Using the Layer menu, you can also highlight effects which you can copy between frames or drag an effect into the wastebin to easily remove it from the frame.



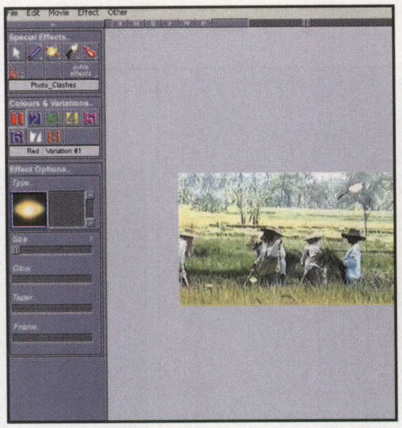
10 You'll notice that as we move through the Timeline and the hay bale moves, its shape changes. Instead of drawing each effect, you could use the Layer menu to copy the effect from one frame and paste it into another. You'll have to change the shape and position of each though, so in this case it's easier to redraw them.



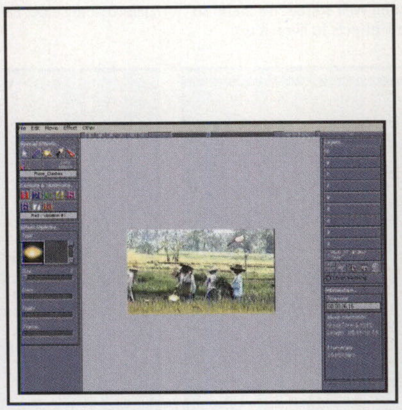
11 As the bale approaches the ground, the speed it's travelling at causes it to change shape so that it isn't present in as many frames. Here it's reduced to a small line on the frame, but what do we do when it hits the ground?



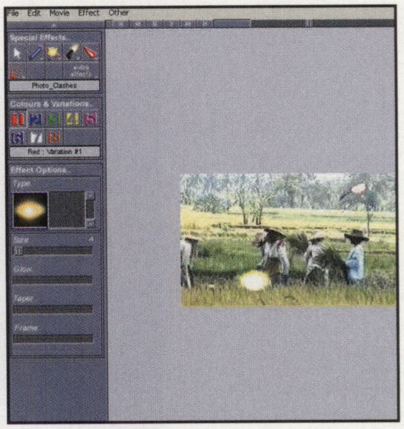
12 By the time we've stepped back to frame 06.15, the hay bale isn't even visible anymore. Rather than have it disappear, let's select another effect called Photo_Clashes to place a 'burst' where the hay hits the ground.



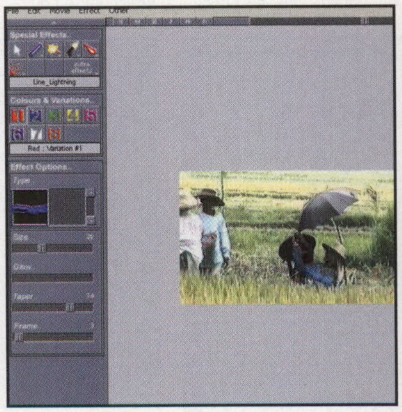
13 We'll start with a small burst (set the Size to 1) and try to place it at the point where the tip of the hay bale from the last frame was visible. Here we've placed the first one just in front of the woman in the foreground and previewed the effect.



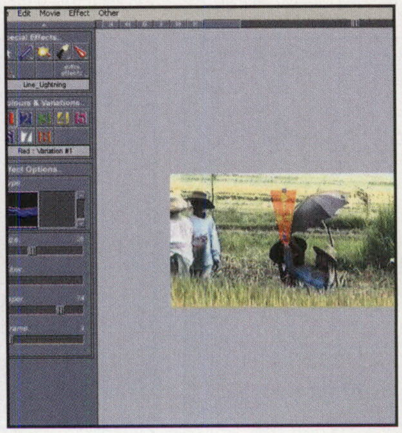
14 Using the right arrow to move forward to the next frame, we've increased the size to 2 and placed the next burst in the same place. A tip to help with the placement is to go back to the previous frame, hover the mouse over the last effect, move forward to the new frame and click there.



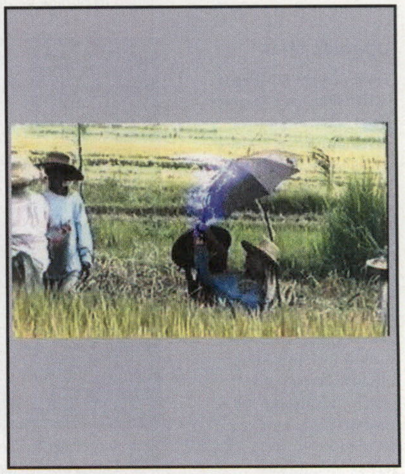
15 Keep stepping forward and increasing the size of the burst each time. Remember that the video will play back at 25 frames a second and an explosion would only last a second or two and the blast will have to contract as well as expand.



16 Jumping forward to 13.11, you find an interesting sequence with some women sitting under an umbrella who seem to be in charge. One of them is raising her hand in a way that screams 'I need an effect' so we've selected the lightning effect to shoot out of her hand.



17 The effect requires two points (a start and an end) and by setting the size and taper you can control what shape the lightening takes. Here we've opted for a size of 36 (the width) and a taper of 74 (which makes it smaller at the hand).



18 The finished effect makes it appear as though the woman has lightning shooting out of her hand (perfect for that 'evil boss' effect).

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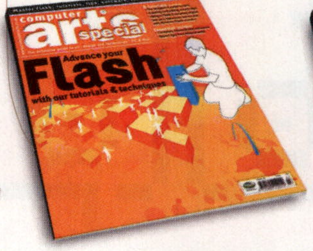

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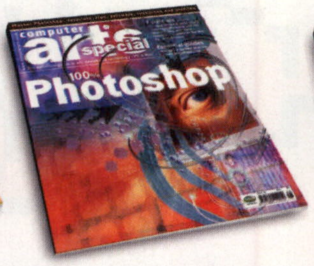

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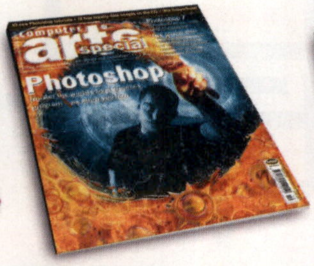

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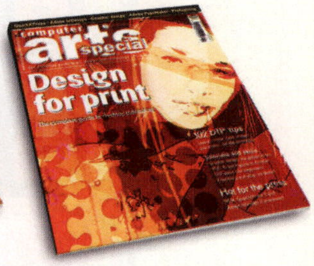

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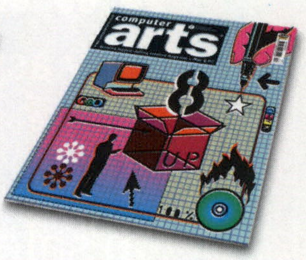

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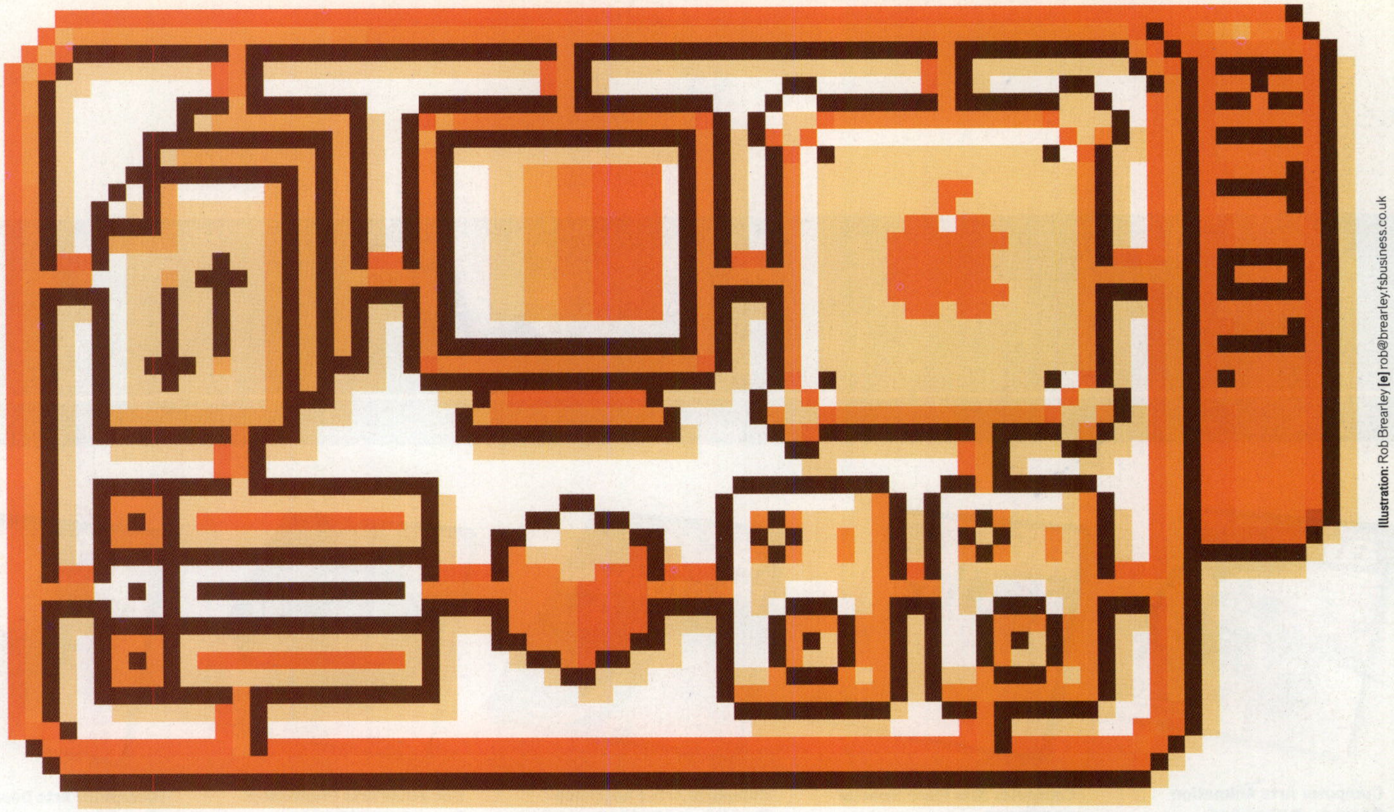

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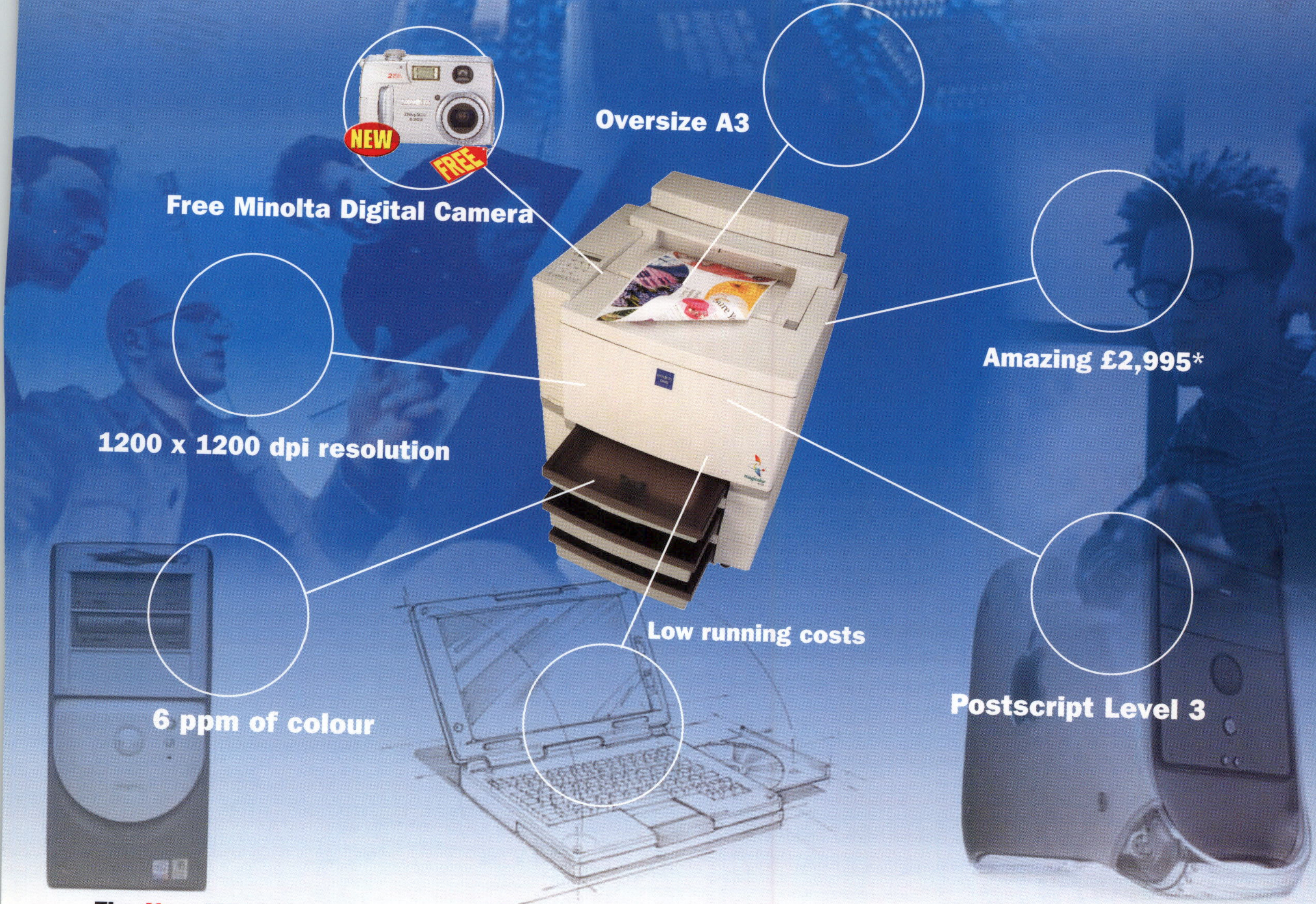

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